# Combined Service Manual

## HP LaserJet 4 / 4M (C2001A / C2021A)

## HP LaserJet 4 Plus / 4M Plus (C2037A / C2039A)

## HP LaserJet 5 / 5M /5N (C3916A/C3917A/ C3952A)

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Publication number
C3916-90984

First edition, March 1996

Printed in USA

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**WARNING**

**Electrical Shock Hazard**

To avoid electrical shock, use only supplied power cords and connect only to properly grounded (3-hole) wall outlets.

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# Conventions

This manual uses the following conventions:

Unless specifically stated otherwise, information applies to all seven printer models (LaserJet 4/4 Plus/4 M/4 M Plus/5/5 M/5 N). Most procedures are combined for all printers, except where they differ substantially.

Color is used to emphasize items which are important to the material under discussion.

The names of major printer parts and assemblies are Capitalized.

**Bold** is used for emphasis, particularly in situations where *italic* type would be confusing.

*Italic* type is used to indicate related documents or emphasis.

COMPUTER type indicates text as seen on a computer monitor.

DISPLAY type indicates text as seen on the printer's 16 character LCD display panel (LaserJet 4Plus/4MPlus only).

KEYFACE indicates keys on a computer keyboard or on the printer's control panel. Examples include Enter, On Line and Go.

**Note** Notes contain important information set off from the text.

**CAUTION** Caution messages alert you to the possibility of damage to equipment or loss of data.

**WARNING!** Warning messages alert you to the possibility of personal injury.

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# 1

# Product Information

**Table 1-1** Printer Features

| Features | HP LJ 4 | HP LJ 4M | HP LJ 4 Plus | HP LJ4M Plus |
|---|---|---|---|---|
| Model | C2001A | C2021A | C2037A | C2039A |
| Printer Speed | 8 ppm | 8 ppm | 12 ppm | 12 ppm |
| Resolution | 300/600 dpi | 300/600 dpi | 300/600 dpi | 300/600 dpi |
| Expandable I/O Buffer | No | No | Yes | Yes |
| Resource Savings | No | No | Yes | Yes |
| MEt | No | No | Yes | Yes |
| REt | Yes | Yes | Yes | Yes |
| Languages | Enhanced PCL5 | Enhanced PCL5, Postscript Level 2 | Enhanced PCL5 | Enhanced PCL5, Postscript Level 2 |
| PostScript Upgradeable | C2080A* | N/A | C3129A* | N/A |
| Resident Memory | 2 MByte | 6 MByte | 2 MByte | 6 MByte |
| Printer Max. Memory Capacity | 34 MByte | 26 MByte | 66 MByte | 50 MByte |
| Available Memory Slots | Four | Two** | Four | Two ** |
| PC Tray Capacity | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets |
| MP Tray Capacity | 100 Sheets | 100 Sheets | 100 Sheets | 100 Sheets |
| Output Capacity | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets |
| 500 Sheet Optional Feeder | C2083A | C2083A | C2083D | C2083D |
| Duplex Option | N/A | N/A | C3157A | C3157A |
| Envelope Feeder | C2082A | C2082A | C2082B | C2082B |
| Typefaces | 45 PCL | 45 PCL<br>35 Postscript | 45 PCL | 45 PCL<br>35 Postscript |
| Interfaces | Serial (25 pin)<br>Parallel | Serial (25 pin)<br>Parallel, Local Talk | Serial (9 pin)<br>Parallel | Serial (9 pin)<br>Parallel<br>Local Talk |
| MIO Slots | Yes | Yes (J2341A) | Yes | Yes (J2552A) |
| EconoMode | No | No | Yes | Yes |
| Cartridge Slot | Yes | Yes | Yes | Yes |
| Power Save | No | No | Yes | Yes |
| Monthly Usage (pages) | Up to 20,000 | Up to 20,000 | Up to 20,000 | Up to 20,000 |

*The PostScript upgrade requires an additional 4 MB SIMM.
**PostScript & Memory SIMM already occupy 2 slots.

## Product Family Information

The model HP C2021A is identical to the model HP C2001A from a hardware standpoint, as is the model HP C2039A to the model HP C2037A. The models HP C2021A and C2039A printers include the following features:

- PostScript Level 2 SIMM
- AppleTalk MIO Card
- 4 MBytes of RAM

In every instance the repair procedures for all products are similar.

Some LaserJet 4 accessories are compatible with the LaserJet 4 Plus and some are not. The compatibility chart below may be used when there is a question of accessory compatibility.

**Table 1-2** Product Family Compatibility Matrix

| Accessory | Description | Does it work in the HPLaserJet 4? | Does it work in the HPLaserJet 4 Plus? |
|---|---|---|---|
| C2082A | Envelope Feeder | Yes | No |
| C2082B | Envelope Feeder | Yes | Yes |
| C2083A | Optional 500 Sheet Feeder Assembly | Yes | No |
| C2083D | Optional 500 Sheet Feeder Assembly | Yes | Yes |
| C2085A | 250 Sheet Universal PC tray | Yes | No |
| C2085D | 250 Sheet Universal PC tray | No | Yes |
| C3129A | PostScript SIMM | No | Yes |
| C2080A | PostScript SIMM | Yes | No |
| C2063A | Memory (1 MByte) | Yes | Yes |
| C2064A | Memory (2 MByte) | Yes | Yes |
| C2065A | Memory (4 MByte) | Yes | Yes |
| C2066A | Memory (8 MByte) | Yes | Yes |
| C3130A * | Memory (1 MByte) | No | Yes |
| C3131A * | Memory (2 MByte) | No | Yes |
| C3132A* | Memory (4 MByte) | No | Yes |
| C3133A* | Memory (8 MByte) | No | Yes |
| C3146A * | Memory (16 MByte) | No | Yes |
| C3157A | Duplex Assembly | No | Yes |
| 92298A | Toner Cartridge | Yes | Yes |

*If HP LaserJet 4 Plus Optional Memory (C3130A, C3131A, C3132A, C3133 or C3146A) is installed in the HP LaserJet 4, the printer will display a “53.1X.08 ERROR” (X indicates the position of the SIMMs slot).

# Identification

The model number is on a label placed on the outside, rear cover of the printer. The model number (C2001A, C2021A, C2037A or C2039A) is found at the top of the label. The model number is the base number for all printers.

The serial number contains information about the printer Country of Origin. The serial number Alpha section refers to the Country of Origin, the Revision Level and the Production Code. The Numeric section refers to the production number of the printer. See the following for information about the production codes.

A typical serial number would consist of: **CC R P XXXXXX**

| *Code* | *Meaning* |
|---|---|
| **CC** | Country of Origin |
| **R** | Revision Number - Alphanumeric, no vowels |
| **P** | Production Code - Alphanumeric, no vowels |
| **XXX-XXXX** | Numeric serial number - Numeric, no alphas |

HEWLETT PACKARD
C2037A
HEWLETT-PACKARD
11311 CHINDEN BLVD.
BOISE, IDAHO 83714 U.S.A.
POWER RATING:
100-120V ~ 50-60 Hz, 7.8A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This product conforms with CDRH radiation performance standard 21 CFR chapter 1, sub-chapter J.
MANUFACTURED:
FCC ID: B94C2037A
C2037A
SERIAL NO.: JPFG 008386
Made in Japan
XXX-XXXX
24131
TR1

**Figure 1-1 Printer Identification Label for the HP LaserJet 4 Plus/4M Plus**

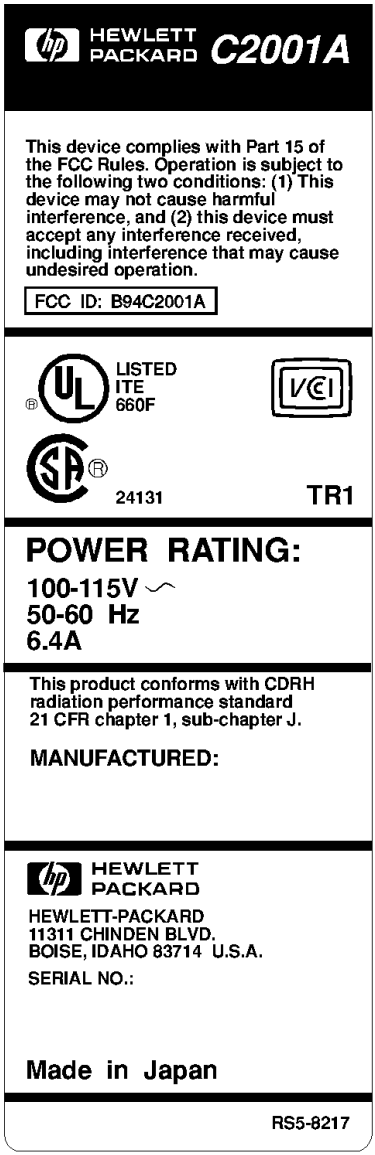

HEWLETT PACKARD C2001A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
FCC ID: B94C2001A
LISTED ITE 660F
24131
TR1
POWER RATING:
100-115V
50-60 Hz
6.4A
This product conforms with CDRH radiation performance standard 21 CFR chapter 1, sub-chapter J.
MANUFACTURED:
HEWLETT PACKARD
HEWLETT-PACKARD
11311 CHINDEN BLVD.
BOISE, IDAHO 83714 U.S.A.
SERIAL NO.:
Made in Japan
RS5-8217

**Figure 1-2 Printer Identification Label for the HP LaserJet 4/4M**

# Specifications

## HP LaserJet 4 and 4 Plus

**Table 1-3** Printer Dimensions

| Dimension | HP LaserJet 4/4M (C2001A/C2021A) | HP LaserJet 4 Plus HP LaserJet 4M Plus (C2037A/C2039A) |
|---|---|---|
| Width | 16.4 in (416 mm) | 16.4 in (416 mm) |
| Depth | 15.9 in (403 mm) | 15.9 in (403 mm) |
| Height | 11.7 in (297 mm) | 11.7 in (297 mm) |
| Weight (with toner cartridge) | 37 lbs. (18.3 kg) | 37 lbs. (18.3 kg) |

**Table 1-4** Power Specifications

| Volts | Freq | Watts (typical) | |
|---|---|---|---|
| | | 4/4M | 4 Plus/4M Plus |
| 100 Vac ± 10%<br>120 Vac ± 10% | 50/60 Hz ± 2 Hz<br>50/60 Hz ± 2 Hz | printing = 195<br>standby = 55 | printing = 300<br>standby = 80<br>PowerSave=25 |
| 220 Vac ± 10%<br>240Vac ± 10% | 50/60 Hz ± 2 Hz<br>50/60 Hz ± 2 Hz | printing = 195<br>standby = 55 | printing =300<br>standby = 80<br>PowerSave=25 |

## Table 1-6 Electrical Specifications

| Status | 100/115 V | | 220/240 V | |
|---|---|---|---|---|
| | 4/4M | 4 Plus/4M Plus | 4/4M | 4 Plus/4M Plus |
| Product Rating | 6.4 amps | 7.8 amps | 3.1 amps | 4.0 amps |
| Peak Inrush Current | 22 amps | 22 amps | 22 amps | 22 amps |
| 25% Decay Time | 13 msec | 18 msec | 11 msec | 11 msec |
| Peak Fuser Current | 38 amps | 51 amps | 17 amps | 22 amps |
| Return-to Average Time | 200 msec | 200 msec | 200 msec | 200 msec |

## Table 1-5 Environmental Specifications

| | |
|---|---|
| Operating Environment | **Temperature:** 10° C to 32.5° C (50° F to 90.5° F)<br>**Humidity:** 20-80% (no condensation) |
| Storage Environment<br>(not including toner cartridge) | **Temperature:** -20° to 60° C (-4° to 140°F)<br>**Humidity**: 15-90% (no condensation) |

# Related Documentation

The following manuals can be ordered from Hewlett-Packard's Support Materials Organization (SMO). The phone number for SMO is (800) 227-8164.

**Table 1-7** Printer Documentation

| HP LaserJet 4 Documents—Description | Part Number |
|---|---|
| Your Guide to Setting Up the HP LaserJet 4 Printer | C2001-90901 |
| HP LaserJet 4 User's Manual | C2001-90912 |
| HP PCL5 Printer Language Technical Reference Package | 5010-3994 |
| HPJet Direct Network Installation Guide | J2552-90011 |
| HPJet Direct Network Software Configuration Guide | J2552-90001 |
| **HP LaserJet 4 Plus Documents—Description** | **Part Number** |
| HP LaserJet 4 Plus and 4M Plus User's Manual | C2037-90901 |
| HP LaserJet 4 Plus Getting Started Guide | C2037-90917 |
| HP LaserJet 4M Plus Getting Started Guide | C2039-90901 |

# Safety Information

## Product and Laser Safety

HP printers are UL 1950 listed, CSA 22.2 950 certified, and manufactured in accordance with DIN IEC 950. The printers are certified as “Class 1” laser products under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard, according to the *Radiation Control for Health and Safety Act* of 1968. The printers do not produce hazardous laser radiation.

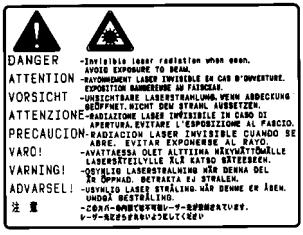
Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

**Note** In accordance with West German standard VDE0836 (VDE-Bestimmung fur die Elektrische Sicherheit von Lasergeraten und Anlagen), two servicemen are required to service each unit.

Since the laser beam is invisible, the label on the following page is attached to the Laser Scanner Cover inside the printer where there is danger of exposure to laser radiation.

**Caution** Never service or operate the printer with the protective cover removed from the laser scanner assembly. The reflected beam, although invisible, can damage your eyes.


DANGER -Invisible laser radiation when open. AVOID EXPOSURE TO BEAM.
ATTENTION -RAYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE. EXPOSITION DANGEREUSE AU FAISCEAU.
VORSICHT -UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.
ATTENZIONE -RADIAZIONE LASER INVISIBILE IN CASO DI APERTURA. EVITARE L'ESPOSIZIONE AL FASCIO.
PRECAUCION -RADIACION LASER INVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO.
VARO! -AVATTAESSA OLET ALTIINA NÄKYVÄTTÄMÄLLE LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEEN.
VARNING! -OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. BETRAKTA EJ STRÅLEN.
ADVARSEL! -USYNLIG LASER STRÅLING NÅR DENNE ER ÅBEN. UNDGÅ BESTRÅLING.

## FCC RFI Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving attenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate this equipment.

**Note** Use of a shielded interface cable is required to comply with the Class B limits of Part 15 of the FCC rules.

This product also meets the FCC Class A emission standards.

## Laser Statement (Sweden/Finland)

**LASERTURVALLISUUS**

**LUOKAN 1 LASERLAITE**
KLASS 1 LASER APPARAT

HP LaserJet(s) 4/4M, 4 Plus/4M Plus laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käytössä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Kirjoittimen on hyväksynyt Suomessa laserturvallisuuden osalta Sähkötarkastuskeskus. Laitteen turvallisuusluokka on määritetty valtioneuvoston päätöksen N:o 472/1985 ja standardin EN 60825 (1991) mukaisesti.

**VAROITUS !** Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

**VARNING !** Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

**HUOLTO** HP LaserJet (s) 4/4M, 4 Plus/4M Plus-kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

**VARO !**Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

**VARNING !**Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsättas användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 770-795 nm
Teho 5 mW
Luokan 3B laser

## Toner Safety

**Note** Toner may stain clothing. Skin and clothing are best cleaned by removing as much toner as possible with a dry tissue, then washing with cold water. Hot water causes toner to melt and permanently fuse into clothing.

A Material Safety Data Sheet (MSDS) for the toner cartridge used in the HP printers, is available through Hewlett-Packard by either mail or fax.

**Mail.** To obtain a MSDS for the 92298A LaserJet Toner Imaging System through the mail, call the Customer Information Center (CIC) at 1-800-752-0900 between 6 A.M. and 5 P.M. Pacific Standard Time.
**Fax.** To obtain a MSDS for the 92298A LaserJet Toner Imaging System by fax, call the HP FIRST number at (800) 333-1917 (U.S. and Canada) and enter document number 1512.

**Note** To get documents from HP FIRST by fax, you must use a Group 3 (touchtone) fax machine.

## Ozone Statement

These printers do not use high voltage corona wires in the electro-photographic process, and therefore generate no measurable ozone gas ($O_3$). They use a charging roller in the toner cartridge and a charging transfer roller in the printer.

# Doing Business with HP

## Technical Assistance

## HP ASAP 1-800-333-1917 (U.S.)

HP ASAP (Automated Support Access Program) provides free technical support information 24 hours a day, 7 days a week. The ASAP system includes HP FIRST and HP AUDIO-TIPS, both explained below. The ASAP service requires a touch-tone phone.

## HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a phone-in fax service providing technical information for HP LaserJet users as well as service personnel. Receiving a fax requires a group 3 facsimile machine or fax card. Service-related information includes:

- Service notes (HP Authorized Dealers) (password = 737842).
- Application notes.
- Product Data Sheets.
- Material Safety Data Sheets (MSDS).
- Typeface and accessory information.
- Printer support software information.
- Toner information.
- Driver request form and Software Matrix.

**HP FIRST, U.S.**

Call the HP ASAP system (1-800-333-1917) and follow the voice prompts to enter HP FIRST.

**HP FIRST, Europe**

Call HP FIRST at one of the following numbers:

U.K., 0-800-96-02-71
Belgium (Dutch), 0800-1-1906
Switzerland (German), 155-1527
Netherlands, 06-02-22-420
Germany, 0130-8100-61
Austria, 0660-8128
For English service outside the above countries, (31) 20-681-5792

**HP AUDIO-TIPS**

HP AUDIO-TIPS, available within HP ASAP, is an interactive voice response system providing pre-recorded answers to the questions most frequently asked by HP LaserJet printer users. Helpful “System Maps” to the HP AUDIO-TIPS recordings are available by fax through HP FIRST.

## HP CompuServe Forum

CompuServe members can download a variety of support materials including product data sheets, software application notes, and printer drivers for many popular software applications. Members may also post and reply to questions in an interactive format. To access the HP Forum, type GO HPPER at any prompt. For more information, or to join CompuServe, call 1-800-524-3388.

## Customer Information Centers

For further technical assistance, service-authorized HP and dealer service personnel can contact the nearest Hewlett-Packard Customer Information Center, 1-800-752-0900 in North America.

## Customer Support Center (Assist Line)

The HP Customer Support Center, (208-323-2551) is available to answer technical questions regarding setup, configuration, installation and operation of HP printers in the PC and Macintosh environments. The CSC Assist Line is available weekdays from 7 am to 6 pm Mountain Time (Wednesdays until 4 pm).

Questions relating to operating systems such as MS-DOS and UNIX, your network configuration, or network operating system cannot be answered by the Center and should be referred to your authorized reseller.

## Printer Drivers

To order additional drivers for your software applications, call the HP Driver Distribution Center at 1-970-339-7009.

## European Customer Support Center

The HP European Customer Support Center, located in Amsterdam, Holland, is open from 8:30 am to 6:00 pm central European time (Wednesdays until 4:00 pm). Multilingual customer support representatives can answer technical questions similar to the U.S. CSC, described on the previous page. This service is available at no charge for a period equivalent to the original HP hardware warranty period.

Each time you call the HP European Customer Support Center, you will be required to provide the printer's serial number and original date of purchase.

To receive a fax listing the supported languages on a country's phone number, call HP FIRST (refer to "HP FIRST," earlier in this section). You can also call the nearest HP Sales and Service office to obtain the telephone number for the Center. The Center features automated call-routing technology, so you will receive faster service if calling from a touchtone phone or tone dialer.

## Other Areas

Outside of North America and Europe, contact your local HP sales office for assistance in obtaining technical support.

# 2

# Site Planning and Requirements

## Site Requirements

The environmental specifications, listed in the *Specifications* section of Chapter 1, must be maintained to ensure the proper operation of this printer. Consider the following points before installing the printer:

- Install the printer in a well-ventilated area.
- Install the printer on a sturdy, level surface.
- Install the printer where the temperature and humidity do not change abruptly. Do not position the printer near water sources, humidifiers, air conditioners, refrigerators, or other major appliances.
- Do not expose the printer to direct sunlight, dust, open flames, or ammonia fumes. If the printer is placed near a window, make sure the window has a curtain or blind to block direct sunlight.
- Install the printer away from walls. There must be enough space around the printer for proper access and operation (see Figure 2-1).

## Printer Space Requirements

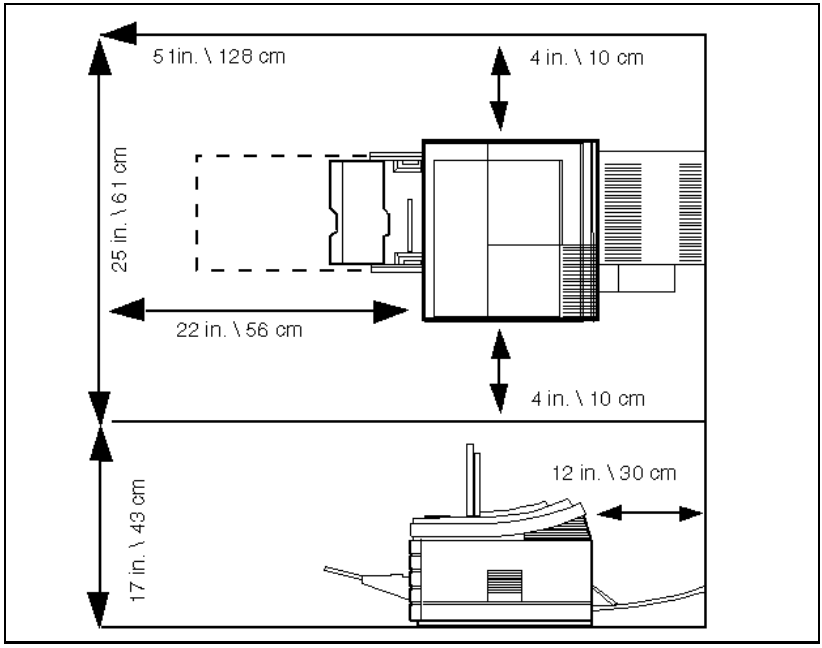



Figure 2-1 Space Requirements

# Print Media Specifications

The complete media specifications are listed in the *HP LaserJet Family Paper Specifications Guide* (part no. 5961-0920), that came with this manual.

Each tray has its own set of paper specifications. *Do not* use paper heavier than 36 pound from the MP tray (Tray 1), 28 pound from the PC tray (Tray 2), or 24 pound from the LC Tray (Tray 3).

**Table 2-1** Media Specifications for MP Tray (Tray 1)

| Media | Size | Capacity | Weight/Thickness Range |
|---|---|---|---|
| Paper | Letter, Legal, Executive, A4 | 100 sheets at 20# (75 g/$m^2$) | 16# to 36# (60 to 135 g/$m^2$) |
| Envelopes | COM10, MONARCH, ISO DL, C5, B5 | 10 of any kind | 16# to 24# (60 to 90 g/$m^2$) |
| Transparencies | Letter, A4 | Approx. 75 | 0.0039 in. to 0.0045 in. thickness (0.099 to 0.114 mm) |
| Labels | Letter, A4 | Approx. 75 | 0.005 in. to 0.007 in. thickness (0.127 to 0.178 mm) |
| *Minimum Size:* 3.5 in. x 6.5 in. (90 mm x 160 mm) | | | |
| *Maximum Size:* 8.5 in. x 14 in. (216 mm x 356 mm) | | | |

**Table 2-2** Media Specifications for PC Tray (Tray 2)

| Media | Size | Capacity | Weight/Thickness Range |
|---|---|---|---|
| Paper | Letter, A4 | 250 sheets at 20# (75 g/$m^2$) | 16# to 28# (60 to 105 g/$m^2$) |

**Table 2-3** Media Specifications for Optional LC Tray (Tray 3)

| Media | Size | Capacity | Weight/Thickness Range |
|---|---|---|---|
| Paper | Letter, A4, Executive | 500 sheets at 20# (75 g/m$^2$) | 16# to 24# (60 to 90 g/m$^2$) |

**Note** Printing heavy paper stock (greater than 24 lb. (90 g/m$^2$) from the 500-sheet Lower Cassette specifically is not supported.

**Table 2-4** Media Specifications for Duplex Assembly (HP LaserJet 4 Plus, 4M Plus, 5, 5M, and 5N printers)

| Media | Size | Weight/Thickness Range |
|---|---|---|
| Paper | Letter, Legal, A4 | 16# to 24# (60 to 90 g/m$^2$) |

## Adhesive Labels

**Note** Printing labels using the Duplex Assembly , the 500-sheet Lower Cassette (Tray 3) or the PC tray (Tray 2) specifically is not supported. Always use the MP tray (Tray 1) to print labels.

### Label Construction

When selecting labels, consider the quality of each component:

- **Adhesives:** The adhesive material should be stable at the 392° F (200° C) temperatures encountered in the printer's fusing process. None of the adhesive should be exposed between the labels.
- **Label arrangement:** If possible, use labels with no exposed areas between labels. If labels with exposed areas *are* used, they should be arranged on the carrier sheet (the backing) so that they cover the entire page *with the exposed areas of the carrier sheet running lengthwise down the sheet*. Using label stock with spaces between labels often results in labels peeling off during the printing cycle, causing serious jamming problems.
- **Label curl:** Labels must lie flat with no more than 0.5in(13mm) of curl in any direction.
- **Poorly manufactured labels:** Do not use labels with wrinkles, bubbles, or other indications of delamination.

## Overhead Transparencies

**Note** Printing overhead transparencies using the Duplex Assembly, the 500-sheet Lower Cassette (Tray 3) or PC tray (Tray 2) specifically is not supported.

Overhead transparencies used in HP LaserJet printers must be able to withstand the 392° F (200° C) temperature encountered in the printer's fusing process. See the *HP LaserJet Family Paper Specifications Guide* for more information.

**Caution** Use only overhead transparencies recommended for use in laser printers.

## Envelopes

Many kinds of envelopes can be printed with your printer. Some envelope styles perform better than others because their construction is better suited to feeding through a laser printer.

Hewlett-Packard Company neither warrants nor recommends the use of a particular brand of envelope. Envelope properties are subject to change by envelope manufacturers, and Hewlett-Packard Company has no control over such changes.

## Envelope Construction

The following table lists the kinds of envelopes you can print in the MP Tray (Tray 1).

**Table 2-5** Specifications for Envelopes

| Item | Specifications |
|---|---|
| Minimum envelope size | 3.5 in x 7 in (86 mm x 178 mm) |
| Maximum envelope size | 7.4 in x 10.5 in (188 mm x 267 mm) |
| Basis Weight | 16 to 24 pound (60 to 90 $g/m^2$) |
| Quantity | Maximum 10 envelopes |
| **Envelope Size** | **Dimensions** |
| Commercial #10 (COM 10) | 4.1 in x 9.5 in (105 mm x 241 mm) |
| #7 3/4 (Monarch) | 3.8 in x 7.5 in (98 mm x 191 mm) |
| DL | 109 mm x 218 mm (4.3 in x 8.6 in) |
| C5 | 163 mm x 231 mm (6.4 in x 9.1 in) |
| B5 | 178 mm x 251 mm (7.0 in x 9.9 in) |

See the *HP LaserJet Family Paper Specifications Guide* for more information.

# 3

# Configuration

## Introduction

The Configuration of the printer consists of setting hard and soft user defaults, and setting up the host computer to communicate with the printer (System Configuration). For installation instructions refer to Installation in the *Getting Started Manual* that is shipped with the printer.

Hard defaults are the I/O Menu and Configuration Menu settings. These are set when the printer is installed and remain as configured. The soft defaults (Printing menu and PCL menu) change with the print job requirements. System Configuration includes installing printer drivers, MODE commands and updating the AUTOEXEC.BAT file.

The instructions in this chapter explain how to access the printer features through the control panel, and how to set up the printer in different configurations. This chapter explains how to check the configuration settings, and how to verify that a configuration is correctly selected.

Setup and configuration information for accessories is available in this chapter. This information is intended to augment and not replace the information provided with the accessories themselves. If possible, use the information provided with the accessories when installing the accessory products.

Use the information that comes with the printer drivers when installing the printer. *Many features of the printer are not available without the correct printer driver for the software application*.

# Using The Control Panel

**(See Appendix B for LaserJet 5 information.)**

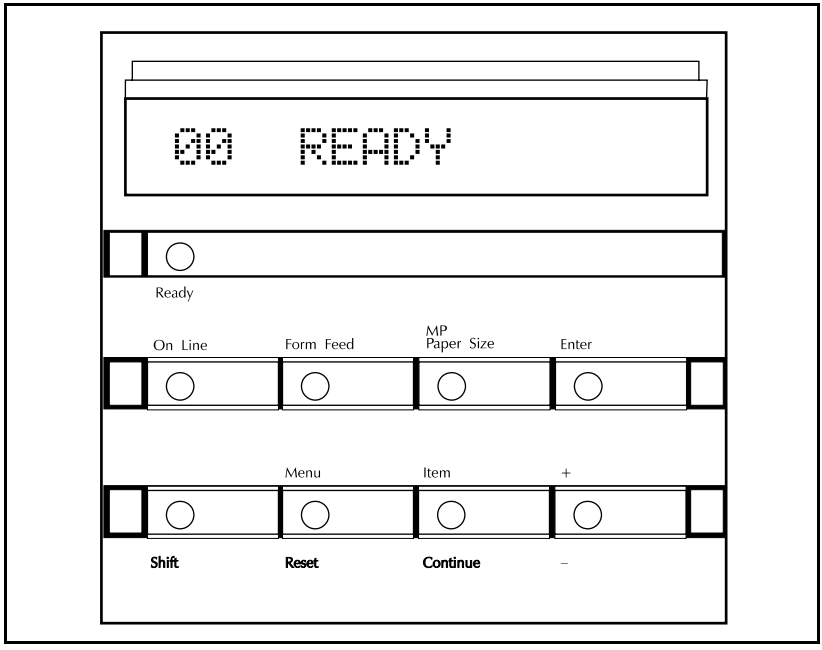



**Figure 3-1 Control Panel Keys**

The control panel (see Figure 3-1) consists of eight keys, three indicator lights, and a 16-character display panel. The three indicator lights are described in Table 3-1.

### Control Panel Keys

There are two rows of control panel keys. The upper row keys have one function each. The lower row keys have a second level of functions which are accessed by holding down **Shift**. Note that the alternate functions **Reset**, **Continue**, and **-** are coded the same color as **Shift**. Table 3-2 details both plain key functions and shift-key combinations.

**Table 3-1** Indicator Lights

| Indicator | Mode | Description |
|---|---|---|
| **Ready** | **On:** | Ready to print. |
| | **Flashing:** | Processing a print job. Do not take off line or switch off. |
| | **Off:** | Not ready; see display for message. |
| **On Line** | **On:** | Ready to receive data. |
| | **Flashing:** | Going from on line to off line. |
| | **Off:** | Off line. Other keys can be accessed. |
| **Form Feed** | **On:** | Data still in printer buffer. |
| | **Flashing:** | Buffered data being printed. |
| | **Off:** | No buffered data in printer. |

**Table 3-2** Control Panel Key Functions

| Key | Function |
|---|---|
| On Line | Switches the printer between ON LINE (communicating with the computer or other data source) and OFF LINE (not communicating). For the printer to receive data, both the On Line and Ready indicator lights must be on. |
| Form Feed | Prints any data remaining in printer's buffer. It cannot be used to send a blank sheet of paper through the printer. |
| MP Paper Size | Selects the physical paper size loaded in the MP tray *only* when it is operating as a PC tray. |
| Enter | Saves a selection in the printer's "permanent" memory. An asterisk (*) appears next to the item to indicate that it is now the default. The selection remains even if the printer is switched off or you perform a reset.<br><br>If buffered data or temporary data (such as temporary downloaded typefaces) are present, Enter only marks the items with an asterisk (*) as the default. When you press On Line or Menu, the message 10 RESET TO SAVE appears. There are three choices:<br><br>Reset — Clears page buffers<br><br>RESET MENU — (See the following table.) Clears page buffers<br><br>On Line — Places the printer on line without performing a reset. |
| Shift | Accesses the lower labels ( Reset, Continue, and -) on the control panel. It works like the Shift key on your computer's keyboard. |
| Menu | Menu cycles through the menu selections, returning to 00 READY at the end of the cycle unless an error, warning, or configuration problem is encountered. If an option such as PostScript or a different I/O has been added, that menu appears in the menu sequence. |
| Continue | Continue (Shift + Item) allows the printer to resume printing after it has been placed off line due to an error condition or a device attendance request (such as 21 PRINT OVERRUN). The Continue key clears most error messages and places the printer back on line. It functions like the On Line key except:<br><br>1. Continue does not override an error condition.<br><br>2. Continue allows you to override the paper or envelope size selection regardless of what size media is in the MP tray.<br><br>3. Continue allows you to override a request to manually feed paper or an envelope; it will select paper from the next available source instead. |
| + or - | + or - allows you to *step* (by momentarily pressing the key) or *scroll* (by holding down the key) through the item choices for a specific menu. Shift + (or -) allows you to cycle through the item choices in reverse order. |

## Reset Menu

Use Reset Menu function with caution. It can result in loss of buffered page data or printer configuration data. Reset Menu is activated by holding down both Shift and Menu *for up to 10 seconds* until RESET=MENU* appears. Use + or - to cycle through items and Enter to select the item. The reset is executed by pressing On Line.

**Table 3-2** Reset Menu Functions

| | |
|---|---|
| Reset (and Menu of Resets) | A reset (Shift + Menu) displays a 07 RESET, clears the printer's page buffer, removes all temporary typefaces and macros, and makes the current user-established defaults "permanent." They will be the default values until they are changed by the user. |
| | To access the Menu of Resets, hold down both Shift and Menu for about 10 seconds until RESET=MENU* appears in the display panel. Use - to cycle through the display choices, and Enter to select the option. Execute the reset by pressing On Line. The printer responds with a reset message for the choice selected. |
| The three RESET= choices are: | MENU* clears the page buffer, removes all temporary personality data such as downloaded typefaces, and resets all printing environment parameters (such as number of copies, paper size, etc.), and sets user-selected defaults (such as MP tray default configuration) to their factory defaults. Certain items, such as the display language or I/O configuration, are not reset. RESET=MENU clears only the active I/O input buffer. |
| | ACTIVE I/O clears the page buffer, removes all perishable personality data such as temporary typefaces, and clears the input and output buffers *for the active I/O only*. |
| | ALL I/O clears the page buffer, removes all perishable personality data such as temporary typefaces, and clears the input and output buffers *for all I/Os*. |

* indicates factory default.

## Control Panel Menus

Figure 3-2 shows the menus and menu items available with the basic printer configuration. Not all menu items are discussed in this section. Only those items of specific interest from a service standpoint, or items new to the printers are discussed in this section. If options such as PostScript or a different I/O are installed, new menu items automatically are added at the appropriate location. For example, a PostScript Menu appears following the PCL Menu.

Figure 3-2 Control Panel Map

| PRINTING MENU | PCL MENU | PS MENU | JOB MENU | CONFIG MENU | MEM CONFIG MENU ✻ | PARALLEL MENU | SERIAL MENU | TEST MENU |
|---|---|---|---|---|---|---|---|---|
| COPIES | FONT SOURCE | PRT PS ERRS | PAGE PROTECT | MP TRAY | I/O BUFFER | HIGH SPEED | SERIAL | SELF TEST |
| PAPER (ENVELOPE) | FONT NUMBER | JAM RECOVER | RESOLUTION | LOCK | I/O SIZE | ADV FUNCTIONS | PACING | CONT SELF TEST |
| ORIENTATION | PITCH or PT SIZE | | PERSONALTY | CLR WARN | RESRCSAVE | | BAUD RATE | PCL TYPEFACE LIST |
| FORM | SYM SET | | PWR SAVER | AUTO CONT | PCL MEM | | ROBUST XON | PCL DEMO PAGE |
| MANUAL FEED | | | I/O TIME OUT | DENSITY | PS MEM | | DTR POLARITY | PS CONFIG PG |
| RET | | | | TONER LOW | | | | PS TYPEFACE LIST |
| ECONOMODE | | | | | | | | PS DEMO PAGE |
| DUPLEX | | | | | | | | |
| BIND | | | | | | | | |

You can change these menu items either from a software application or from the printer's control panel.

You can change these menu items only from the printer's control panel

LaserJet 4 and 4 Plus

LaserJet 4 Plus duplexer option

LaserJet 4 Plus only

LaserJet 4 only

Shaded items appear when printer options are installed.

✻ The Memory Configuration menu appears only when 6 MBytes of memory or more are installed.

**Table 3-3** Printer Menu Items

| Item | Options | Explanation |
|---|---|---|
| COPIES | 1* to 999 | Select any number from 1 to 999. |
| PAPER<br><br><br><br>ENVELOPES | LETTER* (110V printers), LEGAL, A4* (220V printers) EXEC<br><br>COM10* (110V printers), MONARCH, DL* (220V printers), C5, B5 | Sets default image size, unless software setting overrides it. |
| ORIENTATION | P*, L | P means portrait (vertical) and L means landscape (horizontal) orientation. |
| FORM<br>(5 to 128 lines) | 60* (110V printers)<br>64* (220V printers) | Sets vertical spacing from 5 to 28 lines. |
| MANUAL FEED | OFF*, ON | Only for MP Tray. |
| RET | OFF, LIGHT, MEDIUM*, DARK | Refines print quality. |
| ECONOMODE<br>(HP LJ4+only) | OFF*, ON | Reduces amount of toner used. |
| DUPLEX<br>(HP LJ4+ with Duplex only) | OFF*, ON | Allows for printing on both sides of paper. |
| BIND<br>(HP LJ4+with Duplex only) | LONG EDGE*<br>SHORT EDGE | Determines orientation of page. |

*indicates factory default.

## Table 3-3 PCL Menu Items

| Item | Options | Explanation |
|---|---|---|
| FONT SOURCE | I*<br>C<br>S<br>Mn (1-4) | Internal fonts*<br>Cartridge fonts<br>Permanent soft fonts<br>SIMM Module: n=slot number. Typefaces stored in one of the four ROM SIMM slots (M1=slot 1, for example). |
| FONT NUMBER | 0* to 999 | Number assigned to each typeface. |
| PITCH<br>or<br>PT. SIZE | Pitch:<br>10.00*<br>Point:<br>12.00* | Depends on the FONT SOURCE and FONT NUMBER selected. |
| SYM SET | ROMAN-8<br>Many others | A unique grouping of all characters in a font. |

*indicates factory default.

## Table 3-4 Job Menu Items

| Item | Options | Explanation |
|---|---|---|
| RESOLUTION | 300 or 600* | Sets the resolution. |
| PERSONALTY | AUTO*<br>PCL<br>PS (Postscript) | Sets the printer language. |
| PWRSAVE<br>(HP LJ4+ only) | OFF, 15 MIN, 30 MIN,<br>1 HR, 2 HRS, 3 HRS | Sets the amount of time the printer is idle before the fuser shuts down. |
| IO TIMEOUT | 15*<br>(5 to 300) | Time in seconds that the printer waits before ending a print job. |
| PAGE PROTECT<br>(HP LJ4 only) | AUTO*, ON | Only seen with error 21 PRINT OVERRUN. |

*indicates factory default.

**Table 3-5** Configuration Menu Items

| Item | Options | Explanation |
|---|---|---|
| MP TRAY | FIRST* | Paper is selected first. |
| | CASS | Operates as a PC tray. |
| | MANUAL | Operates as a manual feed tray. |
| LOCK | NONE*<br>MP<br>PC<br>LC<br>and combinations | No trays are locked out.<br>The MP tray is locked out.<br>The PC tray is locked out.<br>The optional Lower Cassette is locked out. |
| CLR WARN | ON*, JOB | Indicates a transient condition. |
| AUTO CONT | OFF* | When an error is encountered, printer goes off line until SHIFT + CONTINUE are pressed. |
| | ON | When an error is encountered, printer goes off line for 10 secs., then comes back on line. |
| DENSITY | 1, 2, 3*, 4, 5 | Determines relative darkness of print. Higher numbers yield darker print but shorter toner cartridge life. May take up to 20 pages for new setting to stabilize. |
| LOW TONER | CONT* | Printer remains on line and continues to print after the 16 TONER LOW message is displayed. |
| | STOP | Printer goes off line after the 16 TONER LOW message is displayed. |

*indicates factory default.

## Table 3-6 Memory Configuration Items

| Item | Options | Explanation |
|---|---|---|
| IO BUFFER | AUTO*<br><br>OFF<br>ON | Memory is automatically determined by the printer.<br>No memory is set aside.<br>Size can be manually adjusted |
| IO SIZE | 10K and up | With IO BUFER ON, adjust size in increments of 10. |
| RESRCSAVE | <br><br>AUTO*<br><br><br>OFF<br>ON | Saves resources and extra memory and personality SIMM are installed in printer.<br>Printer automatically determines the amount of memory to allocate to personality.<br>No memory is allocated.<br>Additional memory management selections appear. |
| PCL MEM<br>PS MENU | 0K and up | Increases memory for each installed personality. |

*indicates factory default.

## Table 3-7 Parallel Menu Items

| Item | Options | Explanation |
|---|---|---|
| HIGH SPEED | YES*<br>NO | Sets parallel interface to run at a higher data rate.<br>Sets the parallel interface to run at a slower data rate. |
| ADV FNCTNS | ON*<br>OFF | |

*indicates factory default.

## Table 3-8 Serial Menu Items

| Item | Options | Explanation |
|---|---|---|
| SERIAL | RS-232*<br>RS-422 (HP LJ 4 only) | Use the RS-422 when a longer cable is needed. |
| PACING | DTR/DSR*<br><br>XON/XOFF | Use if the computer requires hardware flow control.<br>Use if the computer requires software flow control. |
| BAUD RATE | 9600*<br>300 to 57600 | Tells how fast information will be transferred from the computer to the printer. |
| ROBUST XON | <br>ON*<br><br>OFF | Appears when pacing is set to XON/XOFF.<br>Printer sends XON when printer is put on line or when sufficient buffer space is available.<br>Printer sends one XON when it can accept more data or when it is put on line. |
| DTR POLARITY | HI*<br>LO | Pin 20 is high.<br>Pin 20 is low. |

*indicates factory default.

## Table 3-9 Test Menu Items

| Item | Explanation |
|---|---|
| SELF TEST | With SELF TEST displayed, press ENTER to run a self test. |
| CONT SELF TEST | Prints continuous self test pages until ON LINE or SHIFT + CONTINUE are pressed. |
| PCL TYPE LIST | Prints a list of typefaces and bitmapped fonts in your printer. |
| PCL DEMO PAGE | Prints a page that illustrates the printer features. |

*indicates factory default.

# Printer Features

Some of the important features of the HP LaserJet 4, 4 Plus, and LaserJet 5 printers are described below.

## Page Protection (HP LaserJet 4 only)

**Note** The default is `PAGE PROTECT=OFF*`. Unless you frequently get `21 PRINT OVERRUN` messages, *you may not need to set a value for page protection.*

Page protection reserves additional memory for the page image process, allowing the printer to create an entire page image in memory before paper starts through the printer. The memory required for page protection is dependent upon the resolution selected: a 600-dpi page can take *4 times* as much memory as a 300-dpi page. If you use page protection, set it for the size you expect to use most often. *Be sure you have sufficient installed memory for the option you select.* Complex graphics and PostScript applications also require more memory than is included in the standard printer configuration.

**Note** Unlike earlier HP LaserJet printers, page protection and resolution can be set regardless of memory installed in the printer. Be aware that setting page protection `ON` will decrease the amount of memory available for other memory dependent features.

## Resource Saving (HP LaserJet 4 Plus and 5 only)

Resource Saving gives the printer the ability to save certain entities such as permanent soft fonts, macros, symbol sets and user-defined graphics patterns when the printer changes personalities, resolutions or page protect modes. For example, if a user switches the LaserJet 4 printer from PCL mode to PostScript mode, all PCL soft fonts macros are lost. The HP LaserJet 4 Plus/4M Plus printer would not clear these entities from memory. When the user switches back to PCL from PostScript all of the PCL entities would still be resident in the HP LaserJet 4 Plus/4M Plus printer. Resource Saving can only be accessed when the printer has the PostScript language installed and a minimum memory configuration of 7 MB. If the printer has a duplexer option, the minimum amount of memory necessary to access Resource Saving is 13 MB.

The Resource Saving configuration is located in the Memory Configuration Menu. Resource Saving can be set for three modes, AUTO (default), ON, and OFF. Auto configuration sets the Resource Saving for PCL and Postscript to a minimum value (400 KBytes) for each personality. Setting Resource Saving to ON allows the user to determine how much printer memory will be used for Resource Saving for the PCL personality and the Postscript personality. The memory can be allocated in 100 KBytes increments. For example, if the user sets the Resource Saving memory size to 200 KBytes, a total of 400 KBytes of memory will be assigned to Resource Saving. 200 KBytes of memory will be used for Postscript Resource Saving and 200 KBytes of memory will be used for PCL Resource Saving. Turning Resource Saving OFF disables the Resource Saving function and no memory is allocated to Resource Saving.

## I/O Buffering (HP LaserJet 4 Plus and 5 only)

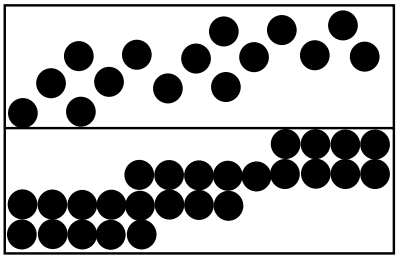
I/O buffering allows the user to allocate printer memory to hold the job while it prints, freeing up the host system sooner, like a print spooler. The standard printer has approximately 10 KBytes of memory allocated to I/O buffering and an additional 100 KBytes of memory is assigned to I/O buffering for each 1 MByte of memory added to the printer.

If the printer has a minimum of 6 MBytes of memory installed (12 MBytes of memory for a printer with a duplex option), the I/O buffer size can also be adjusted from the control panel. Three settings exist for the I/O buffer; AUTO (default), ON, and OFF. AUTO sets the printer's I/O buffer to a minimum value that is determined by the total amount of memory that is resident in the printer. Setting I/O buffering to ON allows the user to set the I/O buffer size from the front panel. Setting the I/O buffering to OFF disables I/O buffering .

**Note** When you change the I/O buffer setting all downloaded resources are deleted.

## EconoMode (HP LaserJet 4 Plus and 5 only)

The EconoMode setting uses approximately 50% less toner than standard mode printing by reducing dot density. EconoMode, which can also be thought of as “draft mode,” is user selectable via a front panel key, a Printer Job Language (PJL) sequence using HP Explorer’s Remote Control Panel or through application software. The default setting is OFF.



EconoMode, Medium Density

Normal Mode, Medium Density

**Note** EconoMode does not affect print speed or memory usage.

## Resolution Enhancement (REt)

The printer Formatter PCA contains circuitry for Resolution Enhancement technology (REt), which modifies the standard video dot data on its way to the DC Controller to produce “smoothed” black-to-white boundaries. REt is user-adjustable from the front control panel, HP Explorer’s Remote Control Panel (Print Quality Category) or from some software applications. Available settings are Light, Medium, Dark or Off. The default setting is Medium.

**Note** REt settings sent from software or printer drivers override any control panel settings.

## Memory Enhancement technology (MEt) (HP LaserJet 4 Plus and 5 only)

HP Memory Enhancement technology (MEt) effectively doubles the printer's standard memory through a variety of font and data compression methods. MEt also automatically compresses fonts for desktop publishing applications.

When printing graphics, MEt analyzes each page as it is being printed and automatically applies a variety of methods to print the complete page at the correct resolution. Two of these methods, Image Adapt and Page Protect, are user-selectable through HP Explorer's Remote Control Panel (Printer Memory Category).

**Note** MEt is only available in PCL mode; it is not functional when printing in PostScript mode.

## Density

Print density is a measure of the darkness of print on the page. The factory default setting is 3, but you can experiment with different settings to find the best setting for your job. The lower numbers lighten the print, the higher numbers darken the print. (1 = low, 5 = high).

Print density can be affected by resolution enhancement, which can be set for dark, medium, or light values.

**Note** When you set the density to a higher number, toner is used at a faster rate, reducing toner cartridge life.

To adjust print density:

1 Press **On Line** to take the printer off line.
2 Press **Menu** until `CONFIG MENU` appears in the display.
3 Press **Item** until `DENSITY` appears in the display.
4 Press **+** or **-** to select the desired setting.
5 Press **Enter** to save the selection.
6 An asterisk (*) appears to indicate that your selection was saved.
7 Press **On Line** to return the printer to active status.
8 Print approximately 20 pages to allow the new density setting to stabilize.

# Network Security

The HP LaserJet 4 Plus and 5 printers allow the System Administrator to lock out other user's ability to change most printer control panel settings. This is done by setting a password and turning LOCK on. The message MENU LOCKED will appear when a user tries to change the printer control panel settings.

**Note** If you forget your password, you can perform a "Cold Reset" by holding down the On Line key (Go on LJ 5) while turning the printer on.

There are four ways to implement printer security:

1 HP Explorer software's Remote Control Panel for DOS users, *if you are directly connected to the printer through its parallel port*.
2 HP LaserJet Utility for Macintosh users.
3 JetAdmin for Novell networks.
4 PJL escape sequence sent from any ASCII editor.

**Remote Control Panel (DOS)**

1 Select OPTIONS from the Remote Control Panel screen.
2 Select SECURITY from the OPTIONS menu.
3 Select **Use Password** from the **Printer Passwords** box.
4 Type in the password and confirm it in the **New Password** box. Numeric password values can be set from 0 to 65535. (If you already have a password, go the the next step; you will be prompted for your password.)
5 To lock the printer's control panel, select ON in the Control Panel Lock box.

**HP LaserJet Utility (Macintosh)**

1 Select the **HP LaserJet Utility** icon in the HP LaserJet folder on your hard drive.
2 If necessary, double click on the **Select Printer** button to select the the appropriate printer.
3 Under the Extras menu, select **Control Panel Lock**.
4 In the **Control Panel Lock: HP LaserJet 4M Plus or 5M** screen, click on the **On (Locked)** box, then click the **OK** button. You will be prompted to enter a password if the password has been set. If a password has not been set, go to the next step.

5 Under the Extras menu, select **Set Printer Password**. On the Printer Security screen, enter the new password (numeric values can be set from 0 to 65535), and click on the **OK** button.

**HP JetAdmin Utility (Novell Networks)**

1 Run JETADMIN.
2 Select the printer you want to configure. It is listed under its "JetDirect Interface Name" which appears on the self test page/configuration plot.
3 Select **Configuration...**. The *Printer I/O Configuration* screen appears.
4 Select **Advance...**. The *Advance Settings* screen appears.
5 Select **Lock Printer Control Panel...**.
6 Click on **Select...** (the *Advanced: Printer Security* screen appears), then click on the **ON** button.
7 Click the **OK** button.

**ASCII PJL Escape Sequence**

**Password:** send this sequence to the printer from any ASCII editor:

**$^{E}_{C}$ %-12345X@PJL JOB**
**@PJL DEFAULT PASSWORD=[*numeric password (0 to 65535)*]**
**@PJL EOJ**
**$^{E}_{C}$ %-12345X**

**CPLOCK:** to turn on or off, assuming that a password has **NOT** been set, send the following ASCII sequence to the printer:

**$^{E}_{C}$ %-12345X@PJL JOB**
**@PJL DEFAULT CPLOCK=ON [*OFF*]**
**@PJL EOJ**
**$^{E}_{C}$ %-12345X**

If a password **HAS** been set, send the following ASCII sequence to the printer to turn CPLOCK on or off.:

**$^{E}_{C}$ %-12345X@PJL JOB PASSWORD=(numeric password)**
**@PJL DEFAULT CPLOCK=ON(OFF)**
**@PJL EOJ**
**$^{E}_{C}$ %-12345X**

# Service Mode

**(Refer to Appendix B for LaserJet 5 information.)**

The Service Mode should be used only by authorized service personnel. The following can be executed while in the Service Mode:

- Print a Service Mode Self Test.
- Verify the Page Count, (the page count also is displayed on the standard self test).
- Set the Page Count.
- Set the Cold Reset Default (This sets the factory default paper size. Use when replacing non-U.S. Formatters).
- Set the Diagnostic Functions *ON* or *OFF* (for software developers use only).
- Demo Page=On/Off. Removes the Demo Page option from the self test menu.
- BIG Data=On/Off (HP LaserJet 4 Plus only). Setting BIG Data to ON increases the size of the printer's status Readback Buffer.

The following procedure is used to initiate the Service Mode.

1. Hold down the ON LINE, FORM FEED, and ENTER keys while powering ON the printer, until the ON LINE and FORM FEED Indicators are both illuminated and **the Display Window is blank**. (If the Display Window reads `05 SELF TEST` at this point, the keys were released too soon. Repeat this step until successful.)
2. Press the FORM FEED key, then the ENTER key. The message `SERVICE MODE` is displayed briefly, then the printer automatically begins a `05 SELF TEST`.

After several seconds, the ON LINE and FORM FEED lights turn OFF. (The printer may display `02 WARMING UP` if it has not warmed up completely.)

After the printer has warmed up and passed the self test, `SERVICE MODE` is displayed.

To exit the Service Mode press the ON LINE key.

## Setting the Page Count

The page count is stored in the printer's Non-Volatile Memory (NVRAM). If it is necessary to replace the Formatter PCA, the page count should be reset to the printer's original page count to reflect the age of the print engine. Use the following procedure to set the page count:

1 Enter the Service Mode as described previously.
2 When SERVICE MODE is displayed, press the MENU key to access the Service Menu. Press the ITEM key to step through the menu.
3 PAGES=XXXXXX is displayed. XXXXXX represents the page count currently stored in the printer's NVRAM. The underlined character denotes the cursor position.
4 Press the ENTER key to scroll the cursor to underline the desired digit.
5 Press the +/- key to select the correct value.
6 Press ENTER to store the new value in NVRAM.
7 Set each digit in the same manner. When the last digit's value has been entered, press ON LINE to return to SERVICE MODE.
8 Click the ON LINE key one more time to exit Service Mode.

## Setting the Cold Reset Default

The default paper size outside of the U.S. is typically A4. Therefore, when replacing Formatters where the desired default is A4, the Customization Variable must be set to A4. This prevents the Cold Reset procedure from resetting the paper size to Letter. To set the Customization Variable:

**1** Enter the Service Mode as described previously.
**2** Press the **Menu** key to display `SERVICE MENU`.
**3** Press the **Item** key to display `CR PAPER=LETTER`
**4** Press the **+/-** key to toggle between Letter and A4 paper.
**5** Press the **Enter** key to save your selection.
**6** Press **On Line** to exit the Service Mode.

# Cold Reset

The Cold Reset feature of the printers allows the printer to be returned instantly to the factory default configuration settings. This feature is valuable because the the Dynamic I/O and PJL features of the printer enable any user connected to any I/O to access and change the default configuration as applications require. When setting up the printer in a new location, or when troubleshooting printer problems, always perform the Cold Reset before entering the selected user defaults. **A Cold Reset can not reset the page count, cold reset tray size, or display language settings.** If the Control Panel is locked, a Cold Reset will disable the lock and return the printer to the factory defaults. Inform the system administrator of all Cold Resets.

A Cold Reset is performed as follows:

1 Turn OFF the printer.
2 Hold the On-Line (or Go for the LJ5) key down while powering ON the printer.
3 The message COLD RESET is displayed. The COLD RESET does not take effect until the 00 READY message is displayed.
4 When the 00 READY message is displayed, the default settings have been returned to the factory defaults and the printer is ready to accept new settings.

# Understanding the PCL Self Test Printout

**(Refer to Appendix B for LaserJet 5 information.)**

**Table 3-10** Self Test Printout Items for the HP LaserJet 4/4M

| Item Figure 3-3 | Explanation |
|---|---|
| 1 | Standard Menu Selections: Shows standard menu selections, such as Printing Menu and PCL Menu, and menu items, such as Copies and MP tray, in the order they appear in the control panel display. |
| 2 | Optional Menus: Shows optional menu selections, such as the PostScript Menu and MIO Menu, and menu items, such as PRT PS ERRS, in the order they appear in the control panel display. An optional menu automatically is added to the control panel display and Self Test printout after the option is added to the printer. |
| 3 | MIO Menu: Once a Modular I/0 is added, it appears after the Serial Menu in the control panel display and in the Self Test. |
| 4 | MIO Information: Reserved for MIO and Network statistics. Note that for some installed MIO options, this block of information can take up to 20 lines and three columns. |
| 5 | Formatter Number: Shows the printer's unique formatter number. |
| 6 | RAM Size: Shows the total amount of installed printer memory, including added optional memory. Two MBytes of installed memory is standard with the printer. If you install optional memory, a self test can be used to verify proper installation. |
| 7 | Page Count: Shows how many pages were printed. You can use the page count to track printer use. The page count is always updated. |
| 8 | Datecodes: Eight-digit dates (YYYYMMDD) indicating when the formatter firmware and internal typefaces were last revised. This information may be of use to a service technician. |
| 9 | Other Installed Options: Use this area of the self test to verify the installation of typeface cartridges, paper trays, and other installed options. |
| 10 | Resolution Enhancement: The REt pattern only appears when the printer is in 600 dpi mode. The REt pattern varies with the RET setting. To optimize REt, adjust REt and density settings to minimize the appearance of vertical lines through the block. |
| 11 | Print Pattern: Use the text print pattern to check print density and quality. |

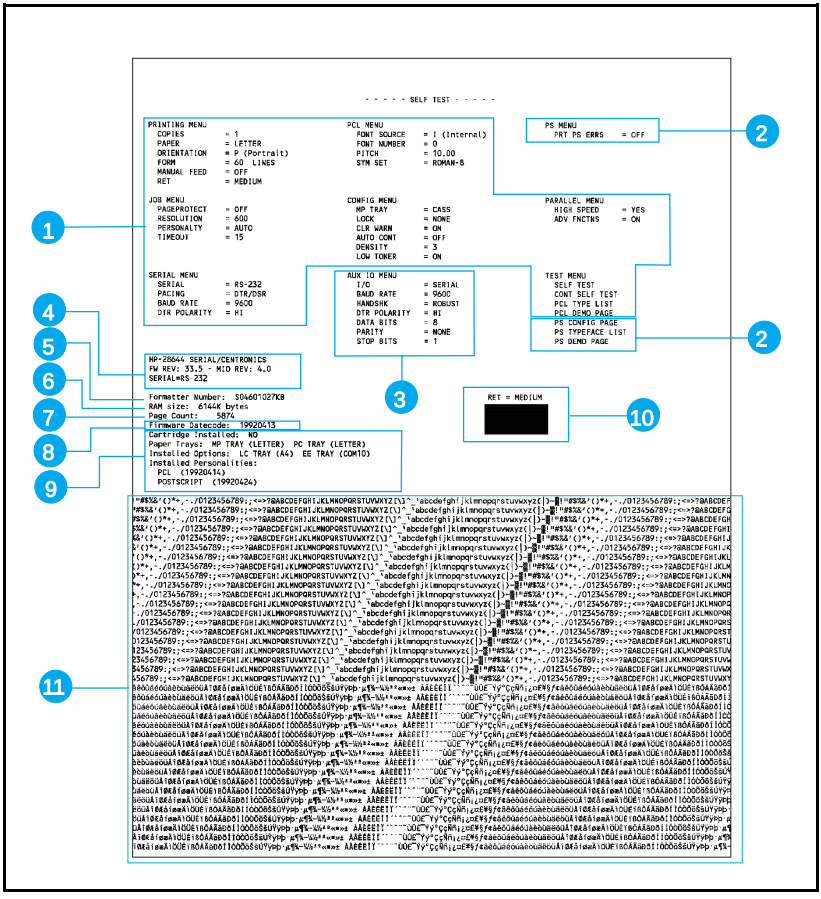



Figure 3-3 HP LaserJet 4/4M PCL Self Test Printout

**Table 3-11** Self Test Printout Items - HP LaserJet 4 Plus/4M Plus

| Item Figure 3-4 | Explanation |
|---|---|
| 1 | **Standard menu selections:** Lists selections in the order in which they appear in the control panel display. |
| 2 | **Optional menus:** Shows optional menu selections, such as the PostScript Menu, and menu items, in the order in which they appear in the control panel display. Optional menus automatically appear in the control panel display when options are added to the printer. |
| 3 | **MIO Menu:** When an optional Modular I/O is added, the MIO Menu appears following the Serial Menu in the self test and control panel display. |
| 4 | **MIO information:** Reserved for MIO and network statistics. For some installed MIO options, this block of information can be as long as 20 lines and three columns. |
| 5 | **Formatter Number:** Shows the printer's unique formatter number. |
| 6 | **RAM size:** Shows total installed printer memory |
| 7 | **PCL Memory Information:** Shows the total amount of installed memory. Also indicates the amount of available memory for PCL applications. |
| 8 | **Page Count:** Shows number of pages the printer has printed. |
| 9 | **Firmware Datecode:** Eight-digit date (YYYYMMDD) and version number of formatter firmware. |
| 10 | **Control Panel options status:** Shows status of control panel Lock and Password functions. |
| 11 | **Other installed options:** Lists optional typeface cartridges, paper trays, personalities, and other installed options. |
| 12 | **Resolution Enhancement:** When resolution is set to 600-dpi, the REt block appears here. The REt block illustrates current resolution enhancement. To optimize REt, adjust REt and density settings to minimize the appearance of vertical lines through the block. |
| 13 | **I/O Buffering and Resource Saving:** Information about the current configuration appears here. If the printer does not have enough memory installed to enable I/O Buffering or Resource Saving, the amount of additional memory needed appears here. |
| 14 | **Print Pattern:** Illustrates print density and quality. |

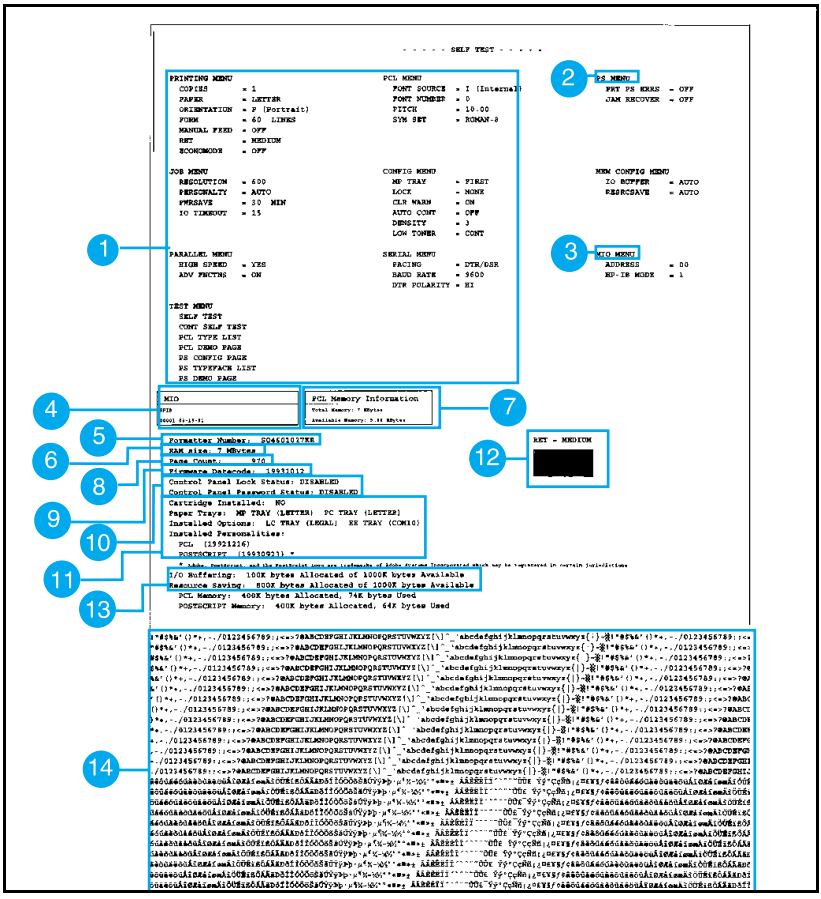



Figure 3-4 HP LaserJet 4 Plus/4M Plus PCL Self Test Printout

# Changing the Control Panel Display Language

The default control panel display language is set for English. Supported languages are: English, French, German, Italian, Spanish, Finnish, Danish, Dutch, Swedish, Norwegian, and Portuguese. Follow these instructions to change the display language.

1 Switch OFF the printer.
2 Press and hold **Enter** (or **Select** on the LJ 5) while switching the printer ON until `CONFIG LANGUAGE` appears in the display.
3 After the power-on self test, `LANGUAGE=ENGLISH` appears. Press **+** until the desired language appears in the display.
4 Press **Enter** to save your choice. An asterisk (*)appears next to the language to indicate it is now the default.
5 Press **On Line**. The On Line indicator is lit, and display messages are now in the language you selected.

**Note** If the display language is changed, replace or install the Control Panel Overlay to match the selected language. See the index to Chapter 6 for instructions on changing or installing the Control Panel Overlay.

**Note** Failure to explicitly select a language after powering on the printer while holding down the **ENTER** or **SELECT** key will cause the printer to prompt for a specific language every time it is powered on.

# Test Print Button

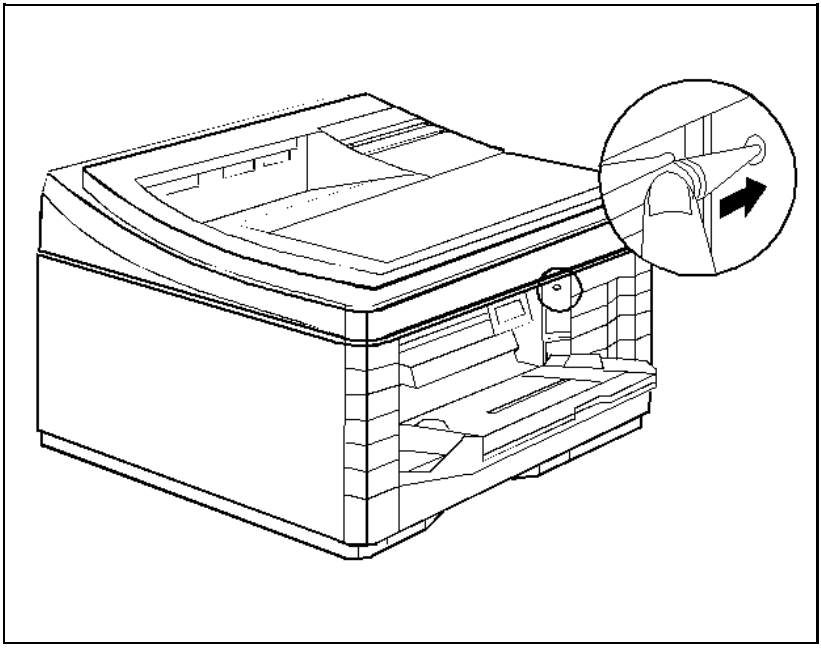


**Figure 3-5 Test Print Button Location**

The Test Print button access hole is located on the side of the printer. Press the Test Print button using a tool similar to a paper clip (see Figure 3-5). The `15 ENGINE TEST` only prints from the PC tray (Tray 2).

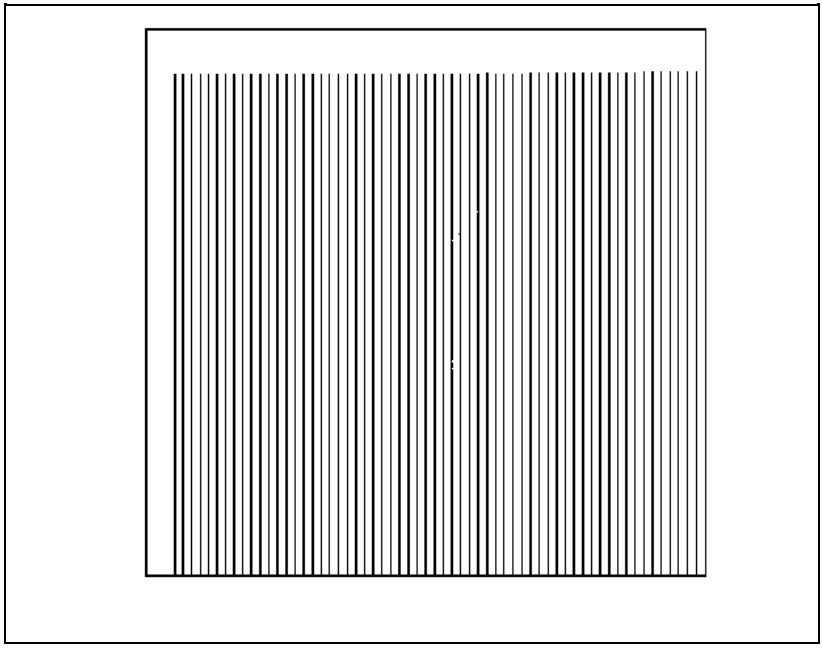


**Figure 3-6 Test Print Pattern**

Pressing the Test Print button will initiate a `15 ENGINE TEST`. This is an engine test only. The Format PCA is bypassed while printing this test, although a formatter problem can interfere with this test. A page of vertical lines is printed if the print engine is operating correctly (see Figure 3-6).

# System Configuration

## MS-DOS System Configuration

To communicate properly with the printer, the MS-DOS environment requires the addition or modification of MODE commands in the AUTOEXEC.BAT file. Add or modify the MODE command(s), depending on the interface configuration, as follows:

## Parallel DOS Commands

Most IBM PC and AT compatible computers default to a parallel printer port. To ensure that information is sent to your parallel printer port, type the following MS-DOS command at your MS-DOS prompt or include it in your AUTOEXEC.BAT file:

```
MODE LPT1:,,P
```

For MS-DOS version 4.0 and above, enter:

```
MODE LPT1:,,B
```

**Note** This example assumes that you are using parallel printer port LPT1. If you are using LPT2 or LPT3, replace LPT1 in the example with the printer port that you are using.

Since the MODE command is an external MS-DOS command (a program named MODE.COM is run when the MODE command is invoked), the program file must be contained in the root directory, or in a directory specified in a preceding PATH command in the AUTOEXEC.BAT file.

**Note** After changing the AUTOEXEC.BAT file, reboot the computer to initiate the changes.

## Serial MS-DOS Commands

Most IBM compatible computers default to a parallel printer port. To ensure that information is sent to your serial printer port, type the following MS-DOS commands at your MS-DOS prompt, or include them in your AUTOEXEC.BAT file.

```
MODE COM1:9600,N,8,1,P

MODE LPT1:=COM1
```

For MS-DOS version 4.0 or above, enter:

```
MODE COM1:9600,N,8,1,B

MODE LPT1:=COM1
```

**Note** These examples assume that you are using serial printer COM1. If you are using COM2 or COM3, replace COM1 with the the printer port that you are using.

Since the MODE command is an external MS-DOS command (a program named MODE.COM is run when the MODE command is invoked), the program file must be contained in the root directory, or in a directory specified in a preceding PATH command in the AUTOEXEC.BAT file.

**Note** After changing the AUTOEXEC.BAT file, reboot the computer to initiate the changes.

# Printer I/O Configuration

## Parallel Menu

The default setting for the High Speed Parallel I/O is YES. If it is set to NO, the interface runs at a slower speed that is compatible with older computers. When the default is set to YES, the parallel interface runs at a higher rate supported by newer computers.

### Advanced Functions

The Advanced Functions feature of the printer enables bi-directional communications between the printer and the host. The default setting is *ON*. This default setting (*ON*) must be active in order to use LaserJet Explorer, the Windows Printing System, and other software applications and drivers.

## Serial Configuration

Use RS-232C serial configuration when the printer is located 11 to 50 feet from the computer. If you need to locate the printer between 51 and 2000 feet from the computer, use an RS-422A serial configuration (not available on the LaserJet 4 Plus or 5).

Since the default-printer I/O setting on the printer is parallel, remember to change the settings on the printer control panel for serial printing.

### Serial Protocol

When printing with a serial configuration, the same protocol must be set on both the printer and the computer. Protocol on the printer is set by changing the control panel. Protocol on the computer is set by using DOS commands. The default protocol settings are described below.

### BAUD Rate

The BAUD-rate setting tells the printer how fast information is transferred to and from the computer. The default BAUD rate setting is:

```
BAUD RATE=9600*.
```

**Pacing (Handshaking)**

Pacing (or "handshaking") is a type of communication between the printer and the computer. This is an important item in the printer because it allows the printer to tell the computer when to send information. If the printer is unable to receive information, for example, when the print buffer is full or when the printer is out of paper, a signal is sent to the computer to stop sending information. When the printer is able to resume receiving information, it sends another signal to the computer to send more data.

Pacing is set through the control panel's Serial Menu. Two types of handshaking are supported by your printer:

- Select DTR/DSR through the Serial Menu's PACING item if the computer requires hardware flow control (most personal computers do). Through the Serial Menu's DTR POLARITY item, the DTR polarity can be set to High or Low. The default is DTR POLARITY=HI
- Select XON/XOFF through the Serial Menu's PACING item if the computer requires software flow control (for example, if you are using a UNIX workstation). Note that status readback messages are not paced when XON/XOFF is selected. Through the Serial Menu's ROBUST XON item, Robust Xon can be set to ON (the default) or OFF. Note that the ROBUST XON item only appears under the Serial Menu if XON/XOFF was selected.

# Serial Cable Pin-outs

The following cable diagrams show the cable pinouts for the most common serial configurations.

**DB-9 RS-232 Serial Connection — HP LaserJet 4**

If the computer has a serial port with 9 pins, use the cable or equivalent for the HP LaserJet 4.

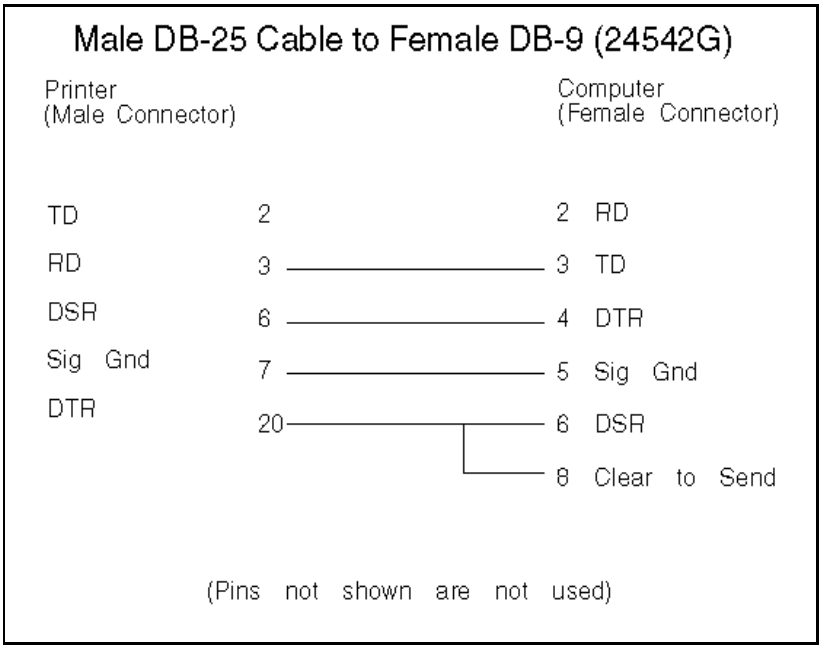



**Figure 3-7 24542G Cable Pinout for 25 to 9 Pin Connector**

### DB-25 RS-232 Serial Connection — HP LaserJet 4 Plus/5

If the computer has a serial port with 9 pins, use the C2932A or equivalent cable for the HP LaserJet 4 Plus.

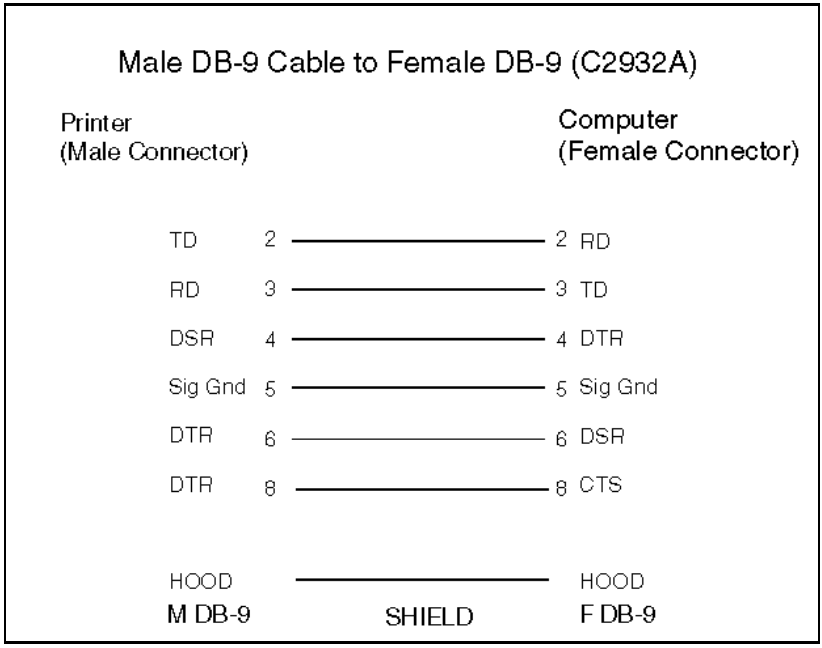



**Figure 3-8 C2932A Cable Pinout for 9 to 9 Pin Connector**

**DB-25 Serial Connection — HP LaserJet 4**

If the computer has a serial port with 25 pins, use the 17255D cable or equivalent for the HP LaserJet 4.

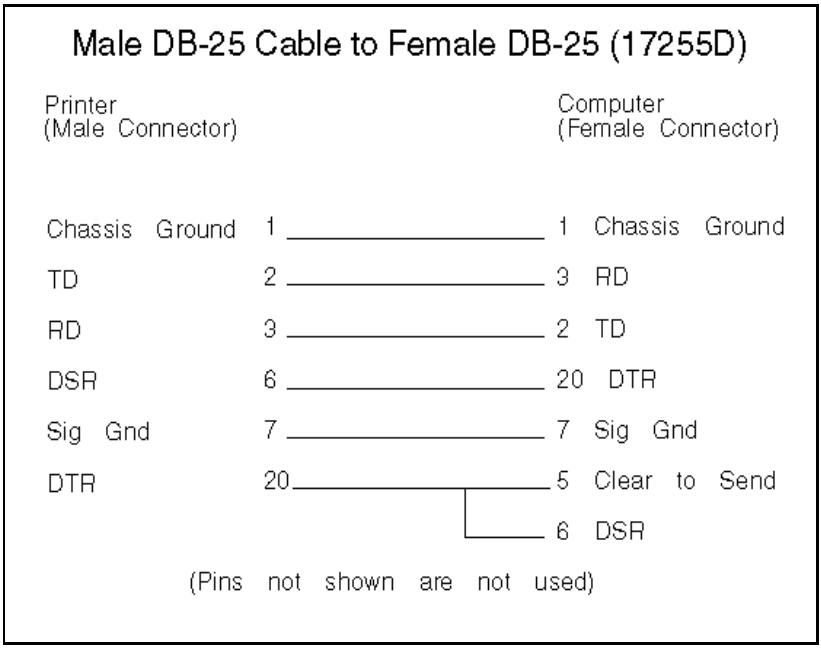



**Figure 3-9 17255D Cable Pinout for 25 to 25 Pin Connector**

### DB-25 RS-232 Serial Connection — HP LaserJet 4 Plus/5

If the computer has a serial port with 25 pins, use the C2933A or equivalent cable for the HP LaserJet 4 Plus.

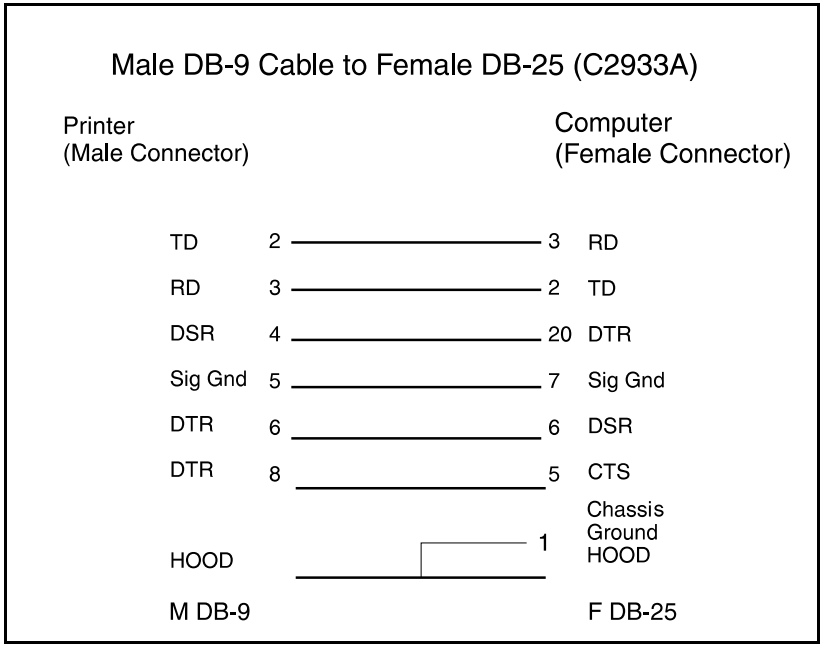



Figure 3-10 C2933A Cable Pinout for 9 to 25 Pin Connector

**RS-422A Serial Connection (Not available on the HP LaserJet 4 Plus or 5 printers)**

If you are configuring the computer to use an RS-422A serial port, you need a special cable. Contact the computer or printer network manufacturer to see if an RS-422A cable is available. If no cable is available, contact your computer manufacturer for your computer pin assignments and have a cable constructed.

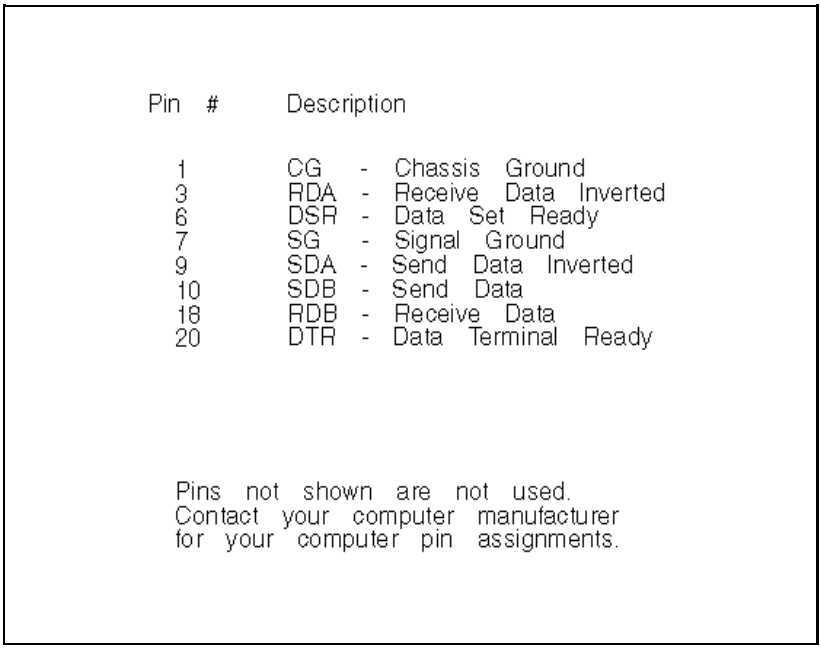

Pin # Description
1 CG - Chassis Ground
3 RDA - Receive Data Inverted
6 DSR - Data Set Ready
7 SG - Signal Ground
9 SDA - Send Data Inverted
10 SDB - Send Data
18 RDB - Receive Data
20 DTR - Data Terminal Ready
Pins not shown are not used.
Contact your computer manufacturer
for your computer pin assignments.

**Figure 3-11 RS-422A Cable Pinout**

## RS-422A Serial Configuration (LaserJet 4 only)

The default configuration for the serial port on the printer is for RS-232C serial communication. To set the printer to use RS-422A serial communication, change the control panel Serial Menu's `SERIAL` setting to `SERIAL=RS-422`.

**Note** Hardware pacing for RS-422 serial communication is not available on the printer.

# Modular I/O Configuration

The printers are equipped with a modular I/O slot. A modular I/O interface card can be plugged into that slot to increase the number of interfaces available.

A modular I/O card can provide increased printer performance when printing from a network. In addition, a modular I/O card provides the ability to place the printer anywhere on the network. This eliminates the need to attach the printer directly to a server or a workstation, and enables you to place your HP LaserJet printer closer to your network users.

**Note** When you install a MIO card, you may need to perform a Cold Reset to reinitialize the printer's control panel.

The HP JetDirect Card allows these printers to operate in multiple operating system networks.

To determine the appropriate MIO solution for a specific host system/application environment, refer to the latest edition of the "HP Peripherals Connectivity Solutions Guide."

# Printer Drivers

## Install Printer Drivers and Utilities

Printer drivers are specialized programs designed to allow specific software applications to function with the HP LaserJet printers. Printer utilities include such things as the HP Explorer program modules, which enhance the usability of the printer and provide convenient access to printer features outside of specific software applications.

### How to Obtain Printer Drivers

First, check the software's printer selection feature to see if the printer is listed among the available printers. If it is not, run the software's SETUP or INSTALL program to install a "printer driver" or "printer file" for the printer.

Here are some ways to obtain printer drivers and Software Application Notes for HP LaserJet printers:

- Check the Printing Software package to see if it includes a driver for your software.
- Order an updated driver from the software vendor.
- Call Hewlett-Packard at 970-339-7009.
- Obtain a driver request form by fax through HP FIRST (call 1-800-333-1917) U.S. only.
- Download a driver through CompuServe's HP Forum. To sign up for CompuServe, call 1-800-524-3388.

**Note** While waiting for a specific HP LaserJet printer driver, you can substitute a similar printer driver (such as a driver for the HP LaserJet III, IIIP, or 4 printer). These substitute drivers will allow you to use the printer, but they do not support all of the printer's features.

# DOS Utilities

Use the DOS Utilities to install printer drivers for MS-DOS applications. Printer driver software for some common software applications are included the DOS Utilities. See the *Doing Business With HP* section of Chapter 1 for information on software drivers not included with the LaserJet DOS Utilities.

A DOS Utilities disk is shipped with every printer. If the DOS Utilities is not installed on the host computer, look for the DOS Utilities software disks in the documentation package that came with the printer and install the software.

# Packing the Printer

## Repackaging Instructions

The printer warranty is for one-year and must be returned to an Authorized HP service center for service. If the original packaging material is no longer available, replacement packing and shipping material is available from HP's Support Material Organization (SMO) for a charge. To order replacement packing and shipping material, call:

**1-800-227-8164 (U.S.)**

**416-678-9430 (Canada)**

To order the shipping box and packing inserts for the printers, ask for part number C2001-00906.

In other countries, return the printer to the selling dealer or the HP-authorized service center for your service area.

## Packing Checklist

- Remove and retain any accessories that were installed in the printer. This includes:
  - Toner Cartridge
  - Optional Lower Cassette
  - Envelope Feeder
  - Accessory Cartridge
  - Duplex Assembly (LaserJet 4 Plus/5)
  - Optional Memory, Personality SIMMs, or Flash
- Include print samples that indicate the problem.
- If the problem is associated with media, include 50-100 sheets of the media causing the problem.

# Installing The Optional Lower Cassette

**Note** Please see also the Service Notes section for proper use and adjustment of the lower cassette.

These printers have an optional 500-sheet Lower Cassette which is installed in the field. Follow these instructions to install the Lower Cassette.

1 Disconnect the cables from the printer.
2 Unpack the 500-sheet Lower Cassette Assembly.
3 Place the Lower Cassette base (without its paper tray) in the selected location.
4 Place the printer on top of the Lower Cassette Assembly, as shown in Figure 3-12.

**Note** Install the printer onto the Lower Cassette Base so that the alignment pins on the cassette base mate with the holes in the bottom of the printer.

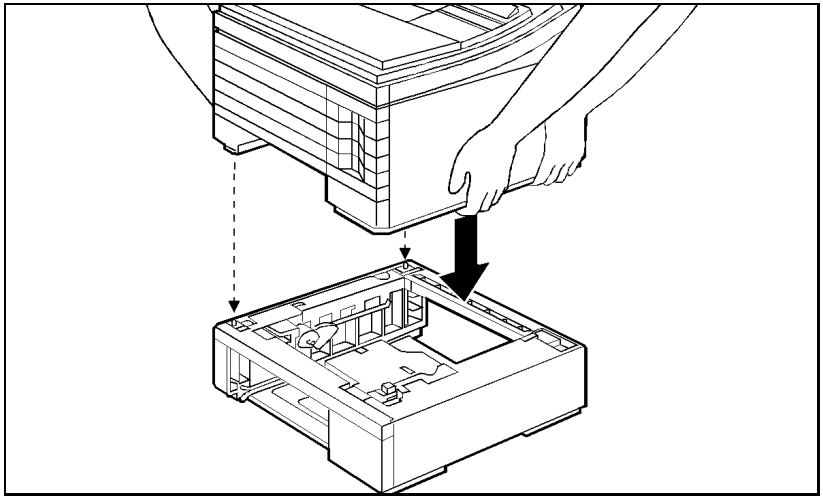


**Figure 3-12 Installing the Printer on the Lower Cassette**

5 Reconnect the printer cables and run a self test to ensure the lower cassette is recognized by the printer.

## Loading Paper into the Optional Lower Cassette

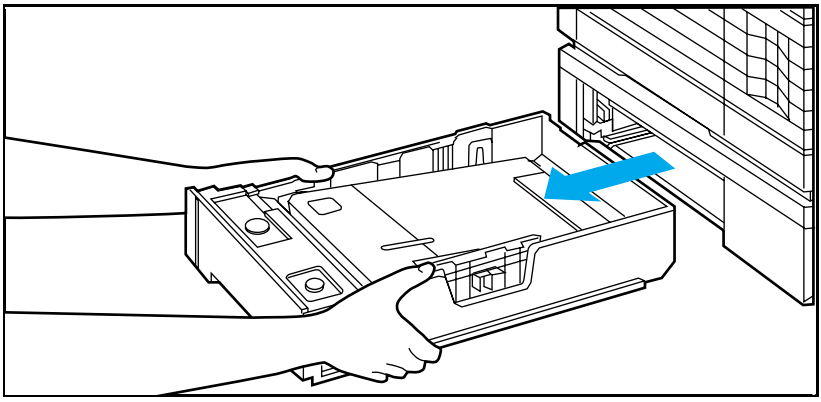


Figure 3-13 Pull the cassette tray straight out of the printer.

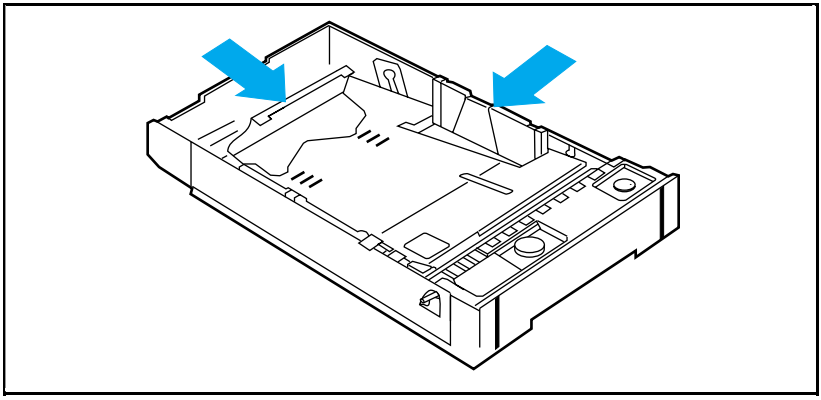


Figure 3-14 Adjust the cassette for the paper size you want to load.

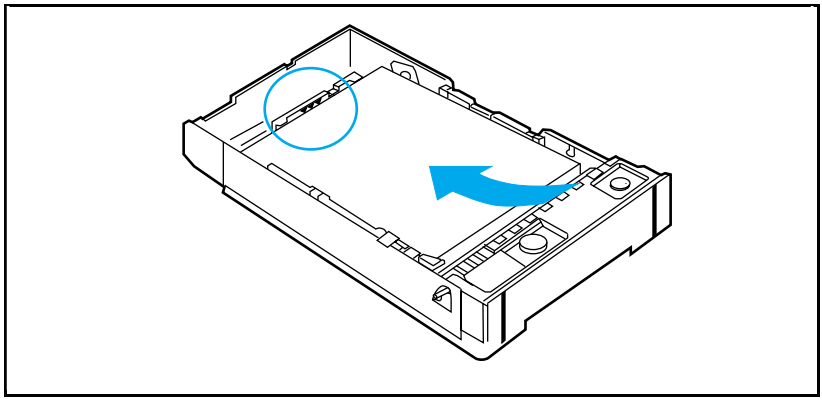


**Figure 3-15** Slide about 450 sheets of paper into the tray, up against the adjustable bracket that sets the paper length.

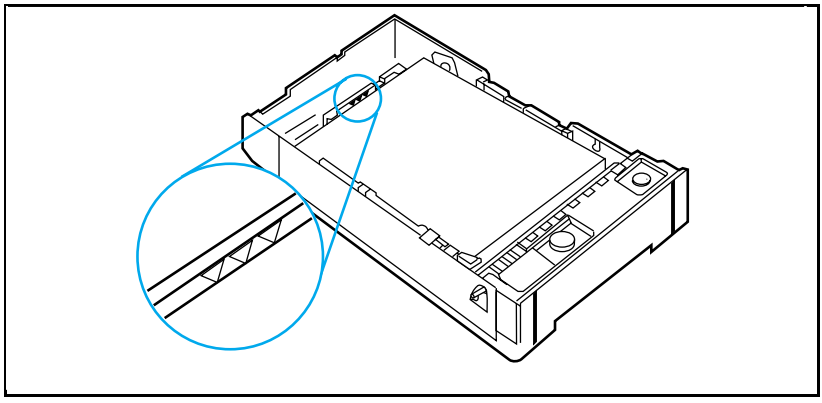


**Figure 3-16** Press down on the stack of paper until the top of the stack fits under the top edge of the back green bracket.

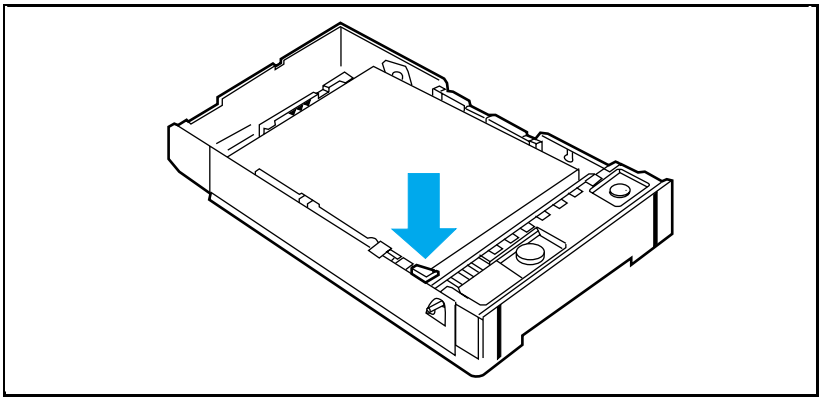


Figure 3-17 Push down the left corner of the stack until the paper is secured undered the metal clip.

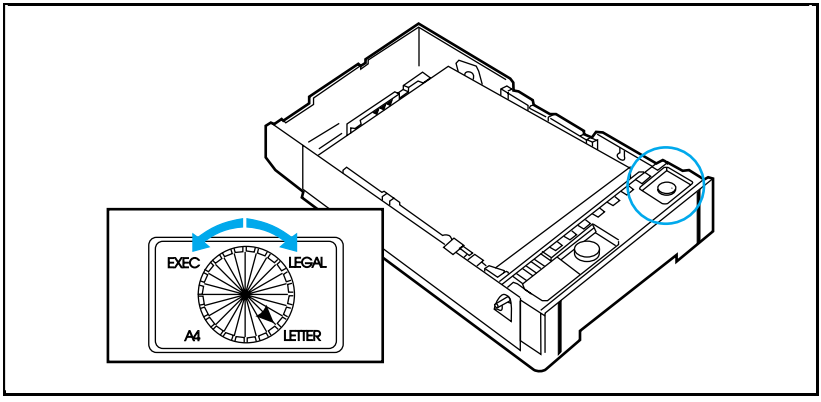



Figure 3-18 Set the knob on the top right of the cassette to the paper size you have loaded.

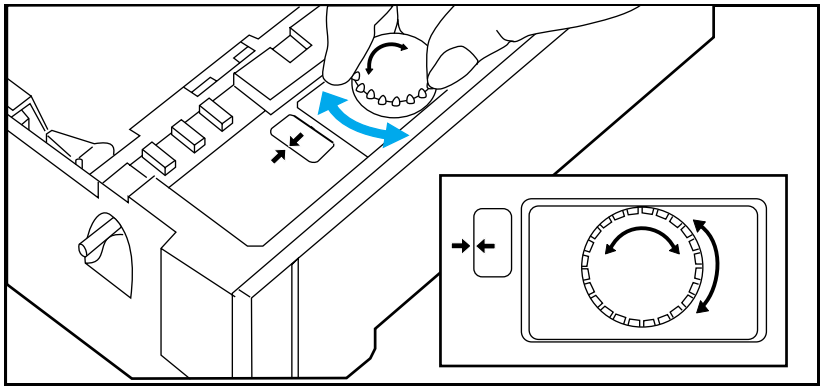


**Figure 3-19** Note: cassette MUST be full before adjusting the tension.
To adjust the tension, tap the stack of paper several times and turn the leftmost knob on the cassette until the arrows on the indicator align. Tap the stack again and verify the arrows are still aligned.

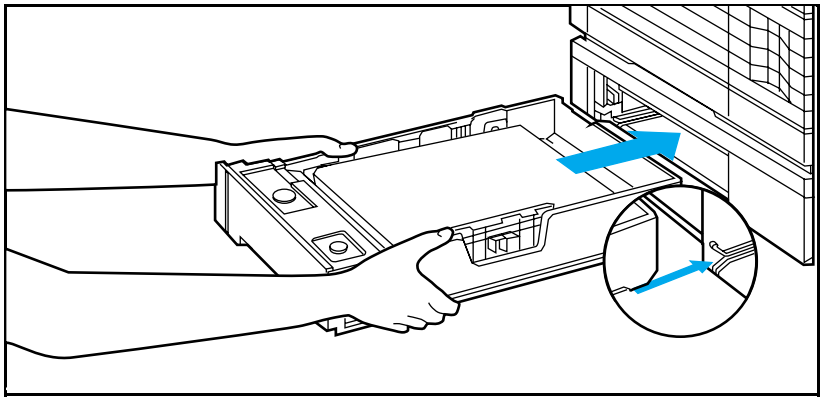


**Figure 3-20** Slide the cassette back into the Lower Cassette assembly.

# Envelope Feeder Installation

For complete information about installing the Envelope Feeder, see *Envelope Feeder User's Guide*. This guide is provided with the envelope feeder. The instructions below are not intended to replace the information of the *Envelope Feeder User's Guide*.

**Note** The LaserJet 4, 4 Plus, and 5 printers all use different envelope feeder products.

To install the Envelope Feeder:

1 Turn OFF the printer.
2 Open the MP tray.
3 Remove the black plastic cover from inside the printer (see Figure 3-21).

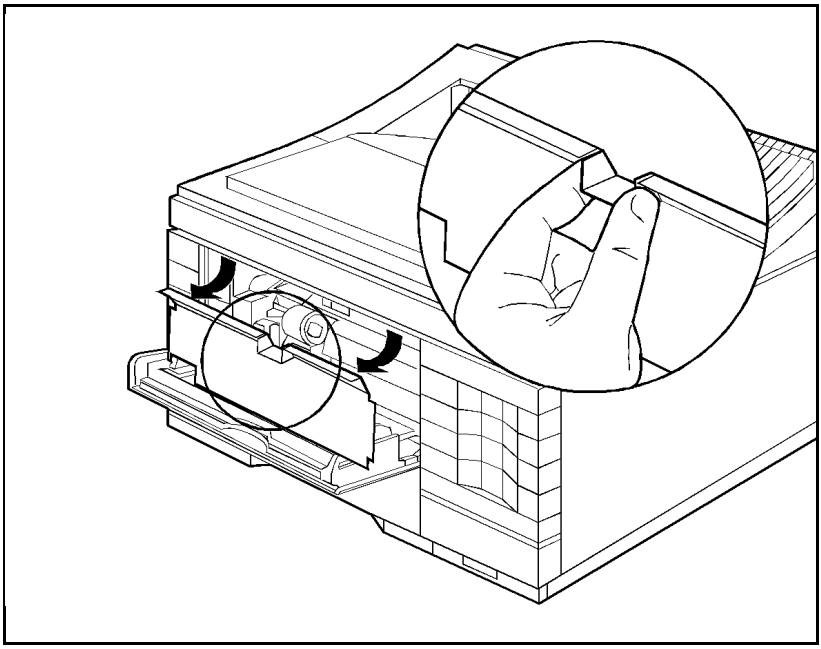


**Figure 3-21 Remove the Black Plastic Cover**

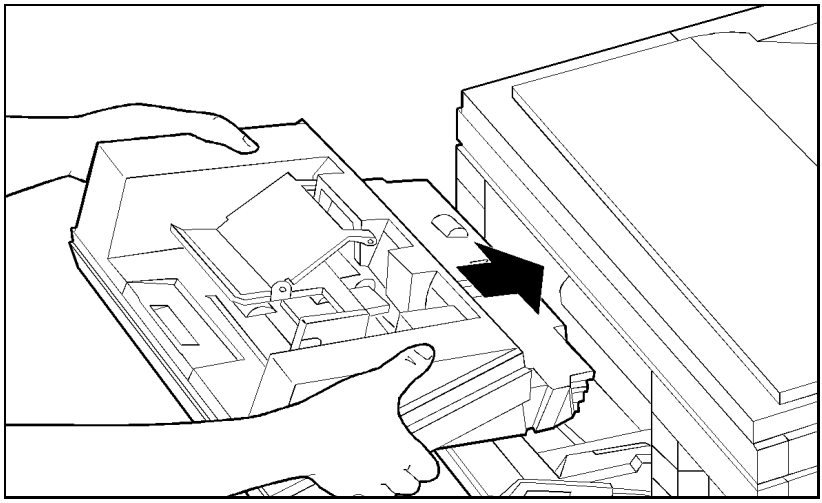


Figure 3-22 Install the Envelope Feeder

4 Insert the Envelope Feeder firmly into the printer (see Figure 3-22).
5 Turn ON the printer.

## LaserJet 4 and 4 Plus

The envelope size (EE TRAY=) appears on the display when the envelope feeder is installed and loaded with envelopes. The envelope size can be selected through the Control Panel. Paper jams can result if the envelope size selected does not match the envelopes loaded into the envelope feeder.

## LaserJet 5

The envelope size (ENV FEED=) appears in the CONFIG MENU when the envelope feeder is installed. The envelope size can be selected in the CONFIG MENU. Paper jams can result if the envelope size selected does not match the envelopes loaded into the envelope feeder.

**Note** It is not necessary to configure the Envelope Feeder to the printer through the printer's Control Panel. The printer automatically recognizes the presence of the Envelope Feeder and prints from the feeder as the software requires.

# SIMM Installation

SIMM installation is covered in detail in the the printer's *User's Manual* and in the kit that accompanies the SIMM. The instructions shown here are not intended to replace these sources.

Follow these instructions to install memory, language, and flash SIMM boards. Install all types of SIMM boards in the same manner.

## Protecting the SIMM Board

SIMM boards can be damaged easily by small amounts of static electricity. To prevent damage from static electricity:

- Touch the surface of the antistatic package before removing the board from its package. When handling the board, frequently touch bare metal on the printer or the antistatic bag, or wear an antistatic wrist strap.
- Avoid moving about the work area to prevent generating static electricity.
- Handle the board carefully at all times. Avoid flexing it or touching its components.

Any SIMM board can be installed in *any* of the four SIMM slots. Because the slots are close together, we recommend installing them from right to left, starting with slot 1 and ending with slot 4.

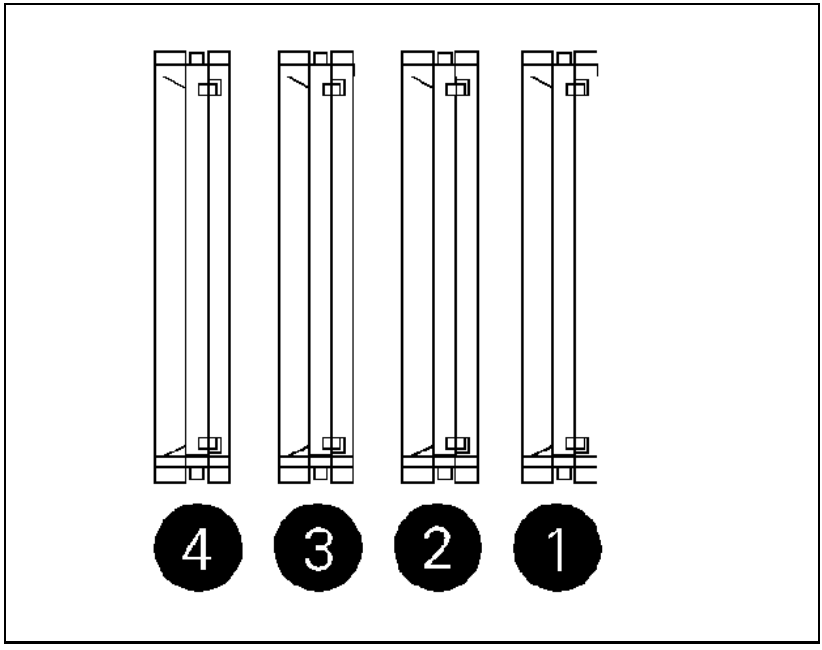



**Figure 3-23 Identifying the Four SIMM Slots**

## Memory Requirements

A page's complexity (rules, graphics, or dense text) may exceed the printer's ability to create the image rapidly enough to keep pace with the printing process. If a page is too complex, only part of the page prints, and some print data loss is likely. In such cases, a `21 PRINT OVERRUN` message (signifying possible loss of print data) or a Clearable Warning message appears in the display.

**Table 3-12** Minimum Memory Recommendations
LaserJet 4 Only

| | PCL Only | | PostScript Only | |
|---|---|---|---|---|
| **Resolution** | **300 dpi** | **600 dpi** | **300 dpi** | **600 dpi** |
| Letter/A4 Pages[1] Page Protect OFF | 2 (1.6)[2] | 2 (1.4) | 2 (1) | 6 (2.3) |
| Legal Pages[1] Page Protect OFF | 2 (1.6) | 2 (1.4) | 3 (1.7) | 6 (1.3)[3] |
| Letter/A4 Pages[1] Page Protect ON | 2 (0.8) | 6 (1.9) | 2 (1) | 6 (2.3) |
| Legal Pages[1] Page Protect ON | 3 (1.6) | 6 (1) | 3 (1.7) | 6 (1.3) |

1 More memory may be required if using downloaded soft fonts, forms, or complex text with a large number of downloaded typefaces.

2 Numbers in parentheses indicate the approximate amount of memory available to the user for data files, downloaded typefaces, and other non-system uses.

3 For PostScript language applications only, a "mini-legal" page will print with this amount of memory.

**Caution** When removing a board from the antistatic package, avoid touching the metal traces on the SIMM board.

For memory boards, compare the part number on the outside of the package to the part number in the table below. If you have not received the correct board, notify your authorized Hewlett-Packard dealer immediately.

**Table 3-13** SIMM boards

| Part Number HP LaserJet 4/4M | Size |
|---|---|
| C2063A | One MB |
| C2064A | Two MB |
| C2065A | Four MB |
| C2066A | Eight MB |
| **HP LaserJet 4+/4M+/5/5M/5N** | **Size** |
| C 3130A | One MB |
| C3131A | Two MB |
| C 3132A | Four MB |
| C 3133A | Eight MB |
| C 3146A | Sixteen MB |

The LaserJet 4 Plus Optional Memory (C3130A, C3131A, C3132A, C3133A, or C3146A) is not compatible with the HP LaserJet 4. If the LaserJet 4 Plus Optional Memory is installed in the LaserJet 4, the printer will display a "`53.1X.00 ERROR`" (X indicates the position of the SIMMs slot).

## Accessing the SIMM Slots

Please refer to Chapter 6, Removal and Replacement, for instructions on removing the SIMMS door to access the slots.

Note that access to the SIMM slots are slightly different for the various printer models.

## Installing the SIMM Boards

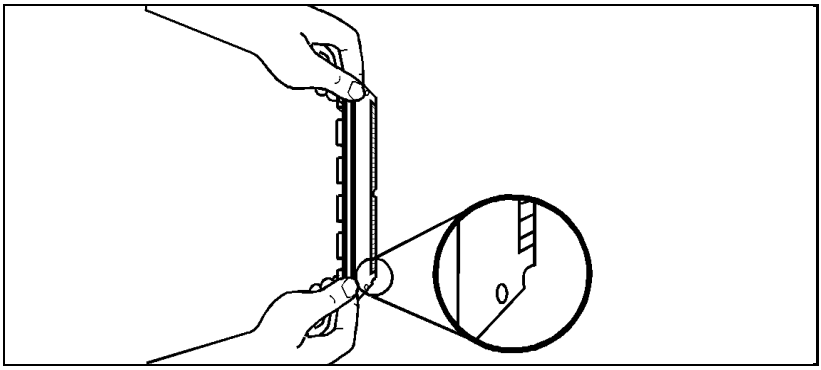


**Figure 3-24 Positioning the SIMM board with the notch at the bottom.**

1 Through the open door, you can see the four SIMM board slots (see previous Figure 3-23). For easiest installation, fill the slots from right to left, starting with slot 1 (see the diagram on the SIMM slots door).
2 Remove the SIMM board from the antistatic package. Hold the board with your forefingers on the side edges and your thumbs against the back edge. Turn the board so the notch on one end is on the *bottom* and the metal teeth face the slot (see Figure 3-24.

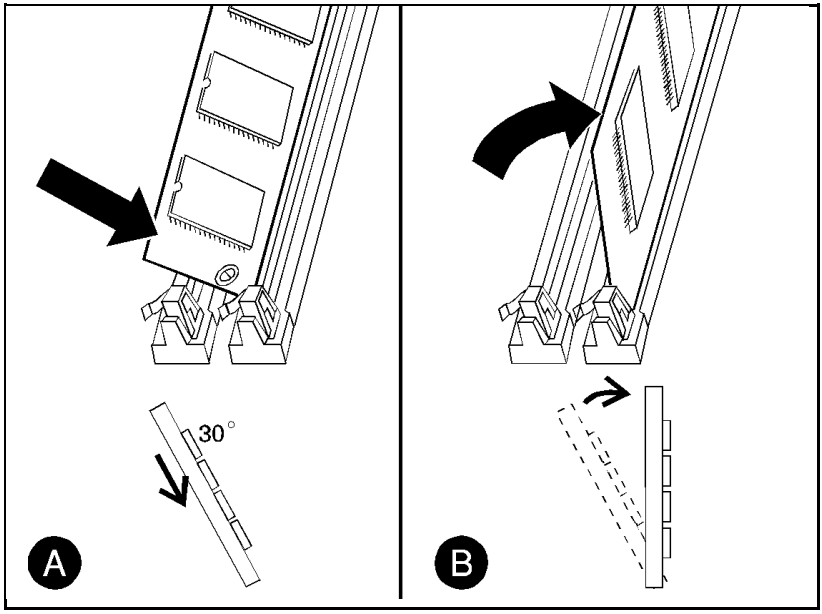



Figure 3-25 Installing the SIMM Board

**3** Hold the SIMM board at a 30-degree angle to the slot and push the edge of the board evenly and firmly into the slot (see Figure 3-25 callout *(A)* ).

**4** Rotate the SIMM board to the right until the board “clicks” into the metal locking tabs, securing the board into place (see Figure 3-25 callout *(B)*).

**5** Gently rock the SIMM board back and forth. If it is seated correctly, it will not lift away from the slot. If it lifts up, you have not pushed it firmly enough into the slot. Try again.

**6** Replace the SIMM door and screws.

**7** Replace the right side cover.

**8** Close the top front cover and gently press down on each end until the cover is completely seated.

# Testing a SIMM Board

Use the procedures below to print a self-test page to verify SIMM board installation. Procedures are given for both memory and PostScript SIMMs.

## Memory SIMM

**Note** For the LaserJet 5/5M/5N, the **On Line** key has been replaced by the **Go** key. The **Enter** key has been replaced by the **Select** key.

### Running a Self Test Printout

1 Plug in the power cord and turn ON the printer.
2 After a few seconds, `00 READY` should appear in the control panel display. If an error message appears, refer to "Troubleshooting a SIMM Board" later in this chapter.
3 Press **On Line** to take the printer off line.
4 Press **Menu** until `TEST MENU` appears in the control panel display.
5 Press **Item** until `SELF TEST` appears in the control panel display.
6 Press **Enter** to print a self test.
7 Press **On Line** after the self test printed.

Locate "RAM SIZE" on the self-test printout. This is the amount of printer memory now installed in the printer.

## Personality SIMM (PostScript)

A personality (printer language) SIMM installation can be verified as outlined below (a PostScript SIMM is used in this example).

**Note** For the LaserJet 5/5M/5N, the **On Line** key has been replaced by the **Go** key. The **Enter** key has been replaced by the **Select** key.

1 Plug in the power cord and turn ON the printer.
2 After a few seconds, the on line indicator should light and `00 READY` should appear in the control panel display. If an error message appears, refer to "Troubleshooting a SIMM Board" following.
3 Press **On Line** to take the printer off line.
4 Press **Menu** until `JOB MENU` appears in the control panel display.
5 Press **Item** until `PERSONALITY=AUTO*`, the default, appears in the control panel display.
6 Press **+** until `PERSONALITY=PS` appears in the display. This indicates that your printer recognizes that PostScript is installed. If `PERSONALITY=PS` does not appear, check the SIMM installation.
7 Press **On Line** to return the printer on line.

# Troubleshooting a SIMM Board

For more information about the service/error messages below, see Chapter 7, *Troubleshooting*.

## Service / Error Messages

One of two messages can be generated when your printer is checking its SIMM internal memory.

```
61.X SERVICE
```

where X = 1, 2, 3, or 4

This error indicates a SIMM parity error. The x indicates which SIMM slot generated the error. If these messages appear first, check the HP part number to make sure you have the right SIMM board.

```
62.X ERROR
```

where X = 0, 1, 2, 3, 4, or 5

This error indicates your printer identified a problem while checking memory.

If x=0, the problem is in internal Read Only Memory (ROM) on the Formatter.

If x = 1, 2, 3, or 4, the problem is in SIMM slot 1, 2, 3, or 4.

If x = 5, the problem is in an external cartridge installed in the printer.

Refer to chapter 7 for more information.

# 4

# Preventive Maintenance

## Introduction

The printer requires minimum routine maintenance. Use this chapter for information on:

- Service Checkpoints. These are the items that must be cleaned and checked when the Toner Cartridge is replaced, or before performing periodic maintenance.
- Toner Cartridge information, such as:
  - Storing and installing the Toner Cartridge
  - Refilled Toner Cartridges
  - `16 TONER LOW` message
- Required periodic maintenance on:
  - Transfer roller
  - Separation pads
  - Paper pickup rollers

# Life Expectancy of Consumables

Always inspect the components listed in Table 4-1 for wear when servicing the printer. Replace these components as needed, based on printer failures or wear, not strictly on usage.

**Table 4-1** Selected Service Consumables

| DESCRIPTION | QTY | EST. LIFE (pages) | REMARKS |
|---|---|---|---|
| 1. Toner Cartridge | 1 | 6800[1] | When print becomes faint, shake cartridge to distribute remaining toner. |
| 2. MP (Tray 1) Pickup Roller Assembly | 1 | 200,000 | Replace roller and separation pad together. |
| 3. PC (Tray 2) Pickup Roller | 1 | 200,000 | Look for glazing and cracks. |
| 4. Separation Pad | 1 | 200,000 | Look for glazing and grooves. Replace together with Pickup Rollers. |
| 5. Transfer Charging Roller | 1 | 200,000 | May affect print quality and/or paper jams. |
| 6. Fuser Assembly (115 V, 50/60 Hz)<br><br>Fuser Assembly (220 V, 50 Hz) | 1<br><br>1 | 200,000<br><br>200,000 | May affect print quality and/or paper jams. Look for marks on rollers. |
| 7. LC (Tray 3) Pickup Roller | 1 | 200,000 | Look for glazing and grooves. Replace the Separation Pad. |
| 8. Exhaust Fan | 1 | 25,000 hrs. | |

Notes:
[1] The estimated Toner Cartridge life is based on A4 or letter size prints with an average of 5% toner coverage, and with the density setting at 3.

**Note** For part numbers of the components listed in Table 4-1, see Chapter 8.

# Service Checkpoints

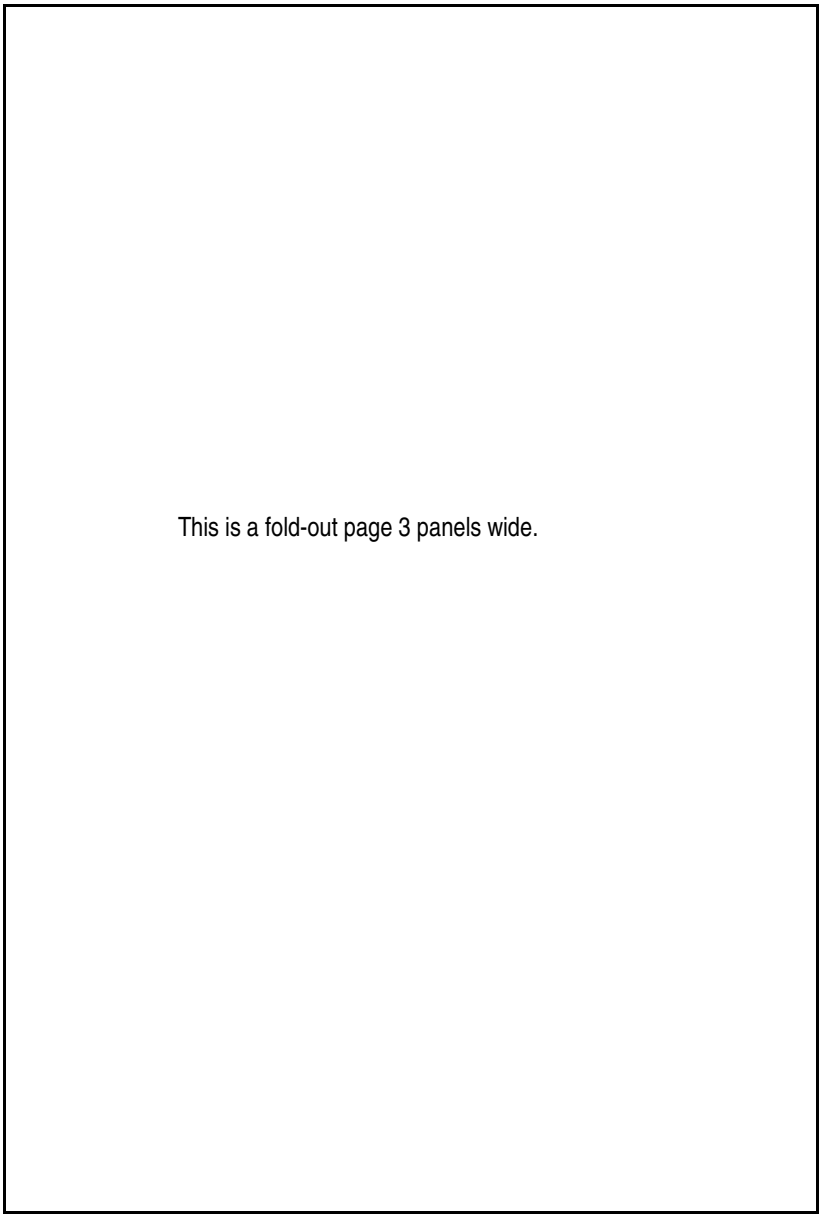



**Figure 4-1 Maintenance Checkpoints**

## Cleaning Your Printer

When it is time to replace the toner cartridge, perform the cleaning procedures outlined in Figure 4-1.

# Toner Cartridge

The toner cartridge in your printer contains the printing mechanism and a supply of toner. *Your toner cartridge life depends on the amount of toner your jobs require.* When you print word-processed text, a toner cartridge lasts approximately 6,800 pages, printed at 5% coverage. (A typical business letter, as shown in Figure 4-2, is about 5% coverage.) This assumes that the print density setting is in the middle range (set to 3 in your printer's control panel).

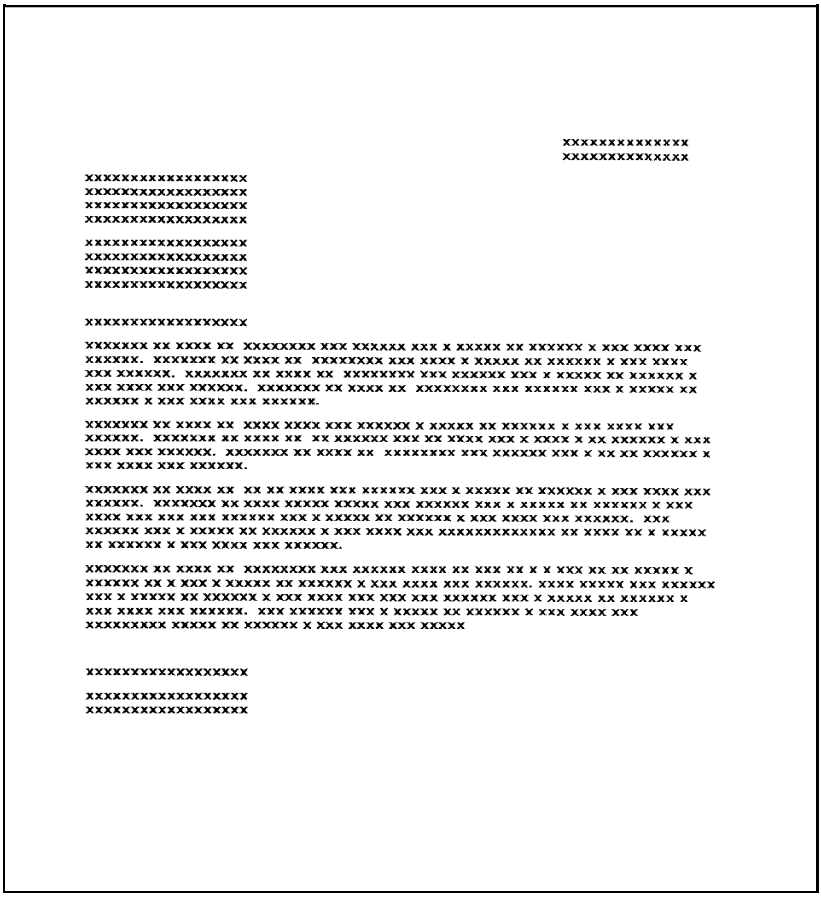


**Figure 4-2** **Example of a page having approximately 5 Percent Toner Coverage**

## Saving Toner with EconoMode (HP LaserJet 4 Plus and 5 Only)

Toner cartridge life can be extended dramatically by using the EconoMode printing feature of the printer. EconoMode can be turned on or off via the printer control panel, through HP's Remote Control Panel or through a software application with the appropriate printer driver.

**Note**

EconoMode is recommended in portrait orientation only.

Some software applications may refer to this as "draft mode".

Software settings always override control panel selections.

## Storing the Toner Cartridge

Do not remove the toner cartridge from its packaging until you are ready to use it. The shelf life of an unopened cartridge package is approximately 2 ½ years of storage including usage; the maximum shelf life of an opened cartridge package is approximately six months including usage.

Use the toner cartridge before the expiration date which is printed on its shipping box.

Always store cartridges:

- As specified on the shipping box, or horizontally (flat) if removed from the box.
- In a normal office environment (for example, a location with regulated temperature and humidity).
- Away from direct sunlight or other strong light.

## Installing the Toner Cartridge

The toner cartridge is empty and must be replaced when the toner low message cannot be cleared, as described in "Clearing the `16 TONER LOW` Message" later in this section.

To replace the toner cartridge:

**1** Open the printer's top cover and remove the empty toner cartridge.

**Note** Inside the new HP toner box is a document which explains HP's toner cartridge recycling policy. Follow the instructions to package the empty toner cartridge and return it for recycling.

**2** Remove the new toner cartridge from its box and remove the storage bag.

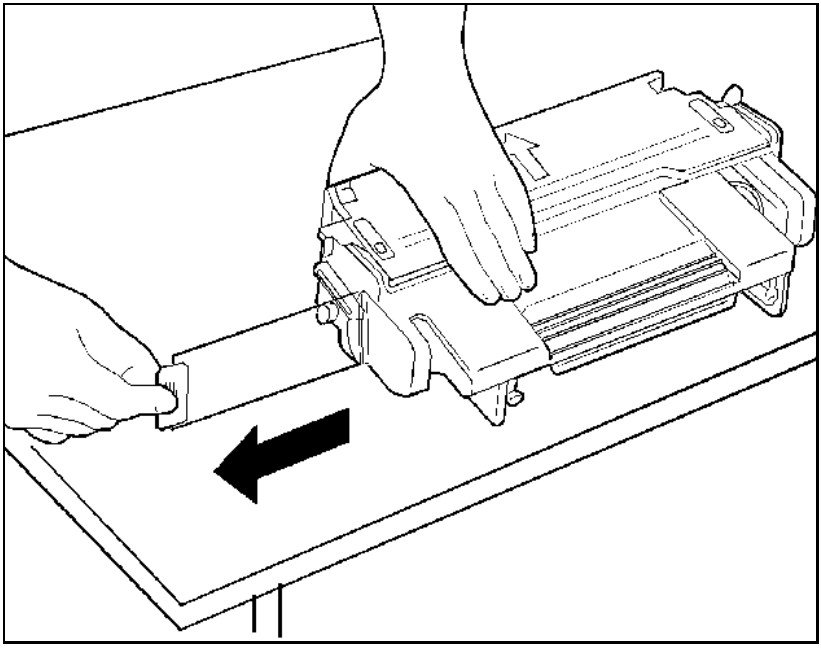


**Figure 4-3 Removing the Toner Cartridge Sealing Tape**

**3** Remove the sealing tape by firmly grasping the tab on the right side of the toner cartridge and pulling it straight out the side of the cartridge. (See Figure 4-3.)

**Note** Pulling the toner cartridge at an angle may damage the toner cartridge seals.

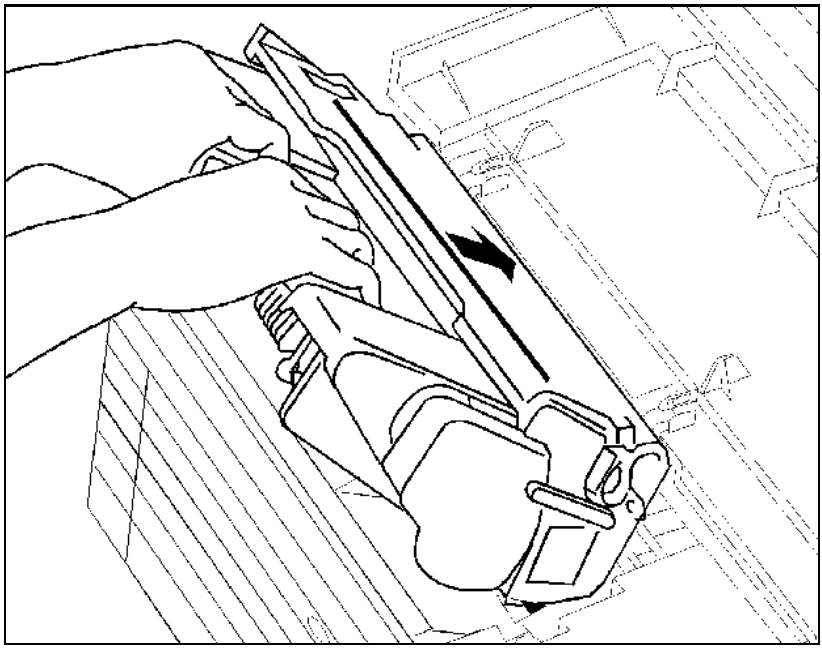


**Figure 4-4 Inserting the Toner Cartridge**

**4** Position the cartridge with the arrow pointing into the printer as shown in Figure 4-4.
**5** Insert the toner cartridge fully into the printer (press firmly).
**6** Close the top cover and press **On Line** (or **Go** on the LJ 5) to resume printing.

## Non-HP Toner Cartridges

While Hewlett-Packard does not prohibit the use of Non-HP toner cartridges during the warranty period or while under a maintenance contract, we do not recommend their use. The reasons for this are:

- Hewlett-Packard has no control or process to ensure that a Non-HP toner cartridge functions at the high level of reliability of an HP LaserJet toner cartridge. Hewlett-Packard also cannot predict what the long term reliability effect on the printer is from using different toner formulations found in Non-HP cartridges.
- Hewlett-Packard has no control over the actual print quality of a Non-HP toner cartridge. The print quality of HP LaserJet cartridges influences the customer's perception of the printer. The high print quality of HP LaserJet printers is one of the primary reasons for the success of the product and we are keenly interested in maintaining that image.
- Repairs resulting from the use of Non-HP toner cartridges are not covered under the HP warranty.

## Clearing the TONER LOW Message

If the `16 TONER LOW` message appears in the control panel display, the toner level in the toner cartridge is getting low. The print becomes lighter and white streaks may appear. (This message means that it is time to replace the toner cartridge).

If the control panel Config Menu Toner Low item is set to `TONER LOW=ON` (or `CONT` on the LJ4+ and LJ5 printers), the printer continues to print with the `16 TONER LOW` message in the control panel display. `TONER LOW=ON` is the default setting.

A Configuration Menu setting `TONER LOW=OFF` (or `STOP` on the LJ4+ and LJ 5 printers) is available that causes the printer to go off-line and to stop printing when low toner is detected. If `TONER LOW=OFF` (or `STOP`) is selected from the Configuration Menu, you must press **Continue** (or **Go** on the LJ 5) to resume printing. Use the `TONER LOW=OFF` (`STOP`) setting when sharing the printer with other users, or when using MICR cartridges.

You can improve the print quality *temporarily* by redistributing the toner as follows:

1. Remove the toner cartridge.
2. Rotate the toner cartridge about its horizontal axis (i.e., not end over end) to redistribute toner.
3. Reinsert the toner cartridge and press **On Line** (or **Go** on the LJ5).

The `16 TONER LOW` message still may appear, but the print quality should improve. If the print remains light, replace the toner cartridge immediately. Install the new cartridge as described in the instructions included with the cartridge.

# Periodic Maintenance Procedures

Each paper source has a Paper Pickup Roller that should be replaced when paper no longer feeds reliably. The MP Tray (Tray 1) Paper Pickup Roller is shown in Figure 4-5. The PC tray (Tray 2) Pickup Roller is shown in Figure 4-7, the LC (Tray 3) Pickup Roller is shown in Figure 4-8.

## Removing the MP Tray (Tray 1) Pickup Roller and Separation Pad

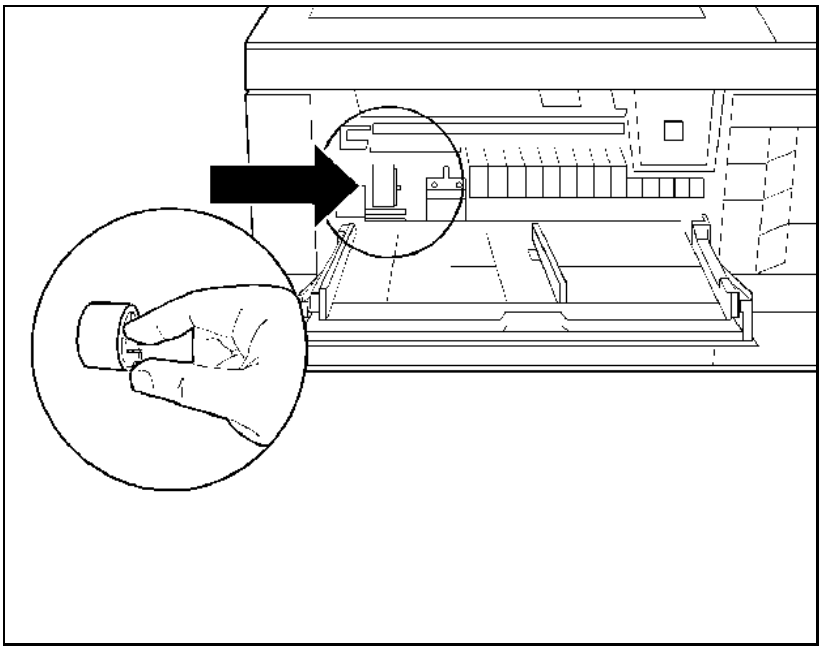


**Figure 4-5 Removing the MP Tray (Tray 1) Pickup Roller**

To remove and replace the MP (Tray 1) Pickup Roller and Separation Pad, follow the steps below.

1 Turn OFF and unplug the printer.
2 Remove the MP Tray (Tray 1) inner black plastic cover.
3 Remove the roller by pinching the plastic retaining clip at the side of the roller and sliding it off its shaft (see Figure 4-5). (You may find it easiest to pinch the clip with your *right* hand and use your *left* index finger to slide the roller to the right.)

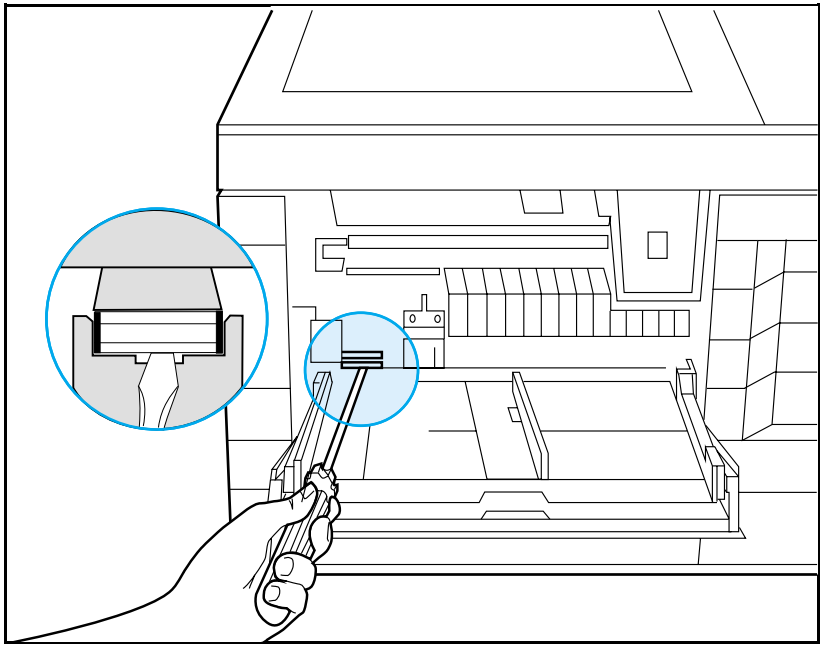


Figure 4-6 Removing the MP Tray (Tray 1) Separation Pad

**4** Insert a small screwdriver into the indent at the front of the separation pad and gently lift the pad from its seat (see Figure 4-6).

**5** Discard the used roller and pad.

## Removing the PC (Tray 2) Pickup Roller

The PC Pickup Roller is underneath the printer (see Figure 4-7). To remove the Pickup Roller:

1 Turn OFF and unplug the power cord from the rear of the printer. If your interface cable is long enough, it may stay attached, if not, remove it also.
2 Remove the Toner Cartridge and the PC tray (Tray 2).
3 Lay the printer on its left side.
4 Remove the PC (Tray 2) Pickup Roller by pinching the release clips and sliding the roller off the shaft.

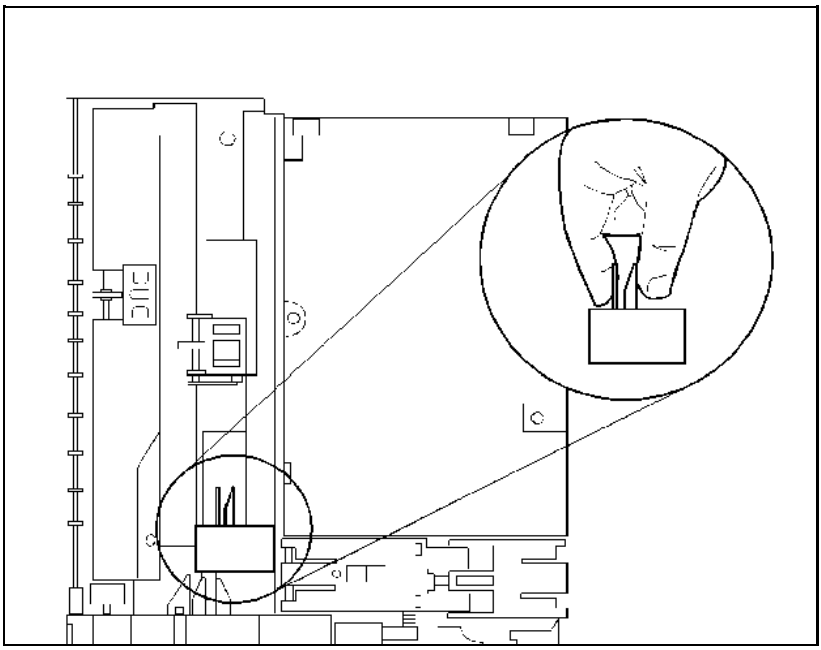


Figure 4-7 Removing the PC (Tray 2) Pickup Roller (printer is turned on its left side)

## Removing the Lower Cassette (LC) or (Tray 3) Pickup Roller

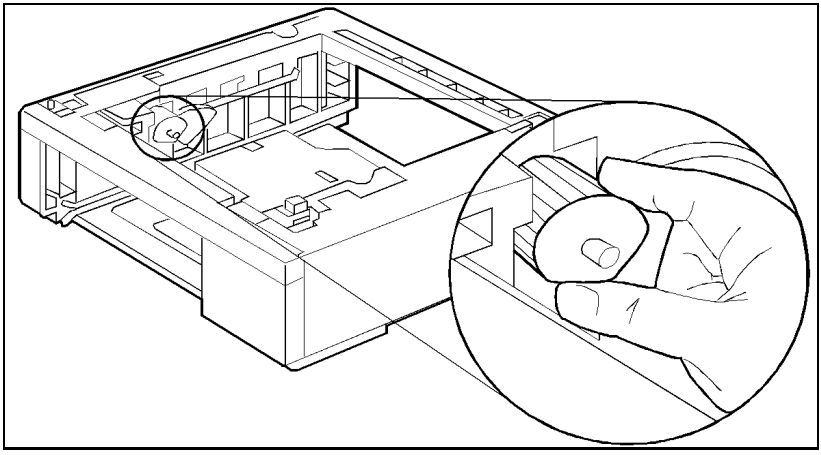


Figure 4-8 Removing the Lower Cassette Pickup Roller

If your printer is equipped with the Lower Cassette Assembly, proceed as follows:

1 Remove the Lower Cassette Tray.
2 Press the retainers that hold the roller in place (see Figure 4-8).
3 Slide the Pickup Roller off the shaft.

## Removing and Replacing the Transfer Roller

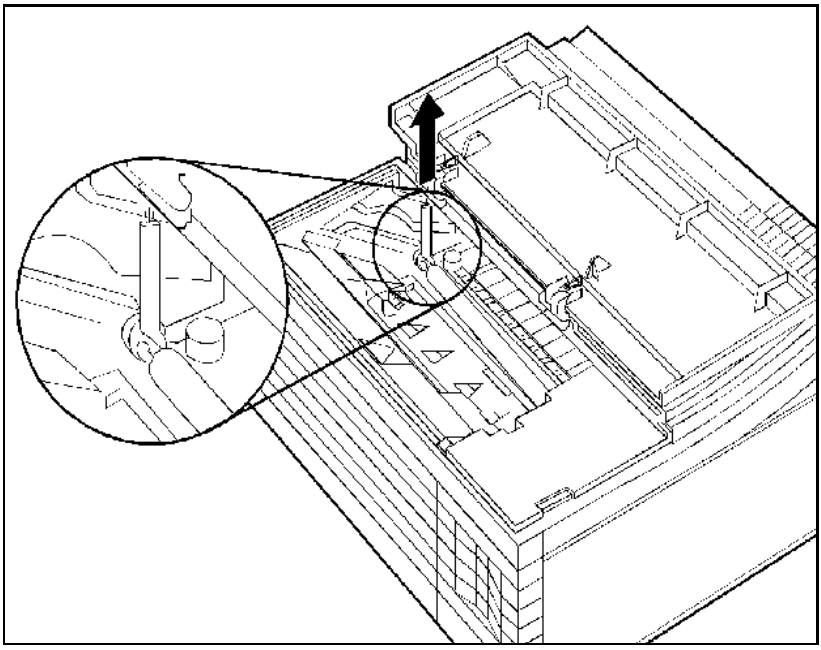


Figure 4-9 Replacing the Transfer Roller

The Transfer Roller is the black sponge-rubber roller located inside the printer just to the front of the black plastic Paper Feed Guide (see Figure 4-9). To remove and replace the Transfer Roller, follow these steps.

**Note** Do not handle the new Transfer Roller unnecessarily. Oils will build up on the roller and cause print quality problems.

**Removing the Transfer Roller**

1 Turn OFF and unplug the printer.
2 Open the printer's top cover.
3 Remove the Toner Cartridge.
4 Use the hook inside the top cover to remove the Transfer Roller as follows. Hook the left side of the chrome rod beside the sponge roller, and lift the roller out.
5 Discard the used roller.

**Replacing the Transfer Roller**

1 Slide the right end of the new roller (the end without the gear), onto the right slot. Press the rod into the slot.
2 Lower the gear end of the roller into place.
3 Install the toner cartridge.
4 Replace the hook tool.
5 Close the top cover.
6 Plug in the power cord and switch the printer ON.

# 5

# Functional Overview

## Introduction

This section of the manual presents a functional overview of the printers. It provides the Service Representative with an understanding of the printing process. Refer to the block diagram of Figure 5-1 to see the relationship of the parts as a whole.

This chapter discusses the following printer functions:

- **DC Controller System**
- **Formatter System**
- **Image Formation System**
- **Paper Feed System**
- **Power System**
- **Basic Sequence of Operation**

## DC Controller System

The DC Controller PCA is responsible for coordinating all activities involved in the printing process. The DC Controller enables the drive circuitry for the laser beam, and coordinates print data from the Formatter PCA with paper size, laser beam motion, the high voltage system, fuser temperature, and motors. The DC Controller also shares machine status information with the Formatter PCA so that proper diagnostic messages are displayed on the control panel.

The DC Controller communicates with the Paper Control PCA, the High Voltage PCA, the Envelope Feeder, Lower Cassette Assembly and Duplex Assembly by way of two serial data lines (SLI and SLO). One line (SLO) is used for sending commands, the other (SLI) is used for receiving status information from the selected devices. The amount of toner in the Toner Cartridge also is monitored indirectly with information on the serial data line.

In summary, the following systems and functions are controlled and/or monitored by the DC Controller:

- **Paper Motion**
- **Laser and Scanner Drive**
- **Timing**
- **Machine Status**
- **Paper Size and Availability**
- **High Voltage System**
- **Fusing Temperature**
- **Main Motor Drive**
- **DC Power Supply**
- **Toner Level**

# DC Controller Loads

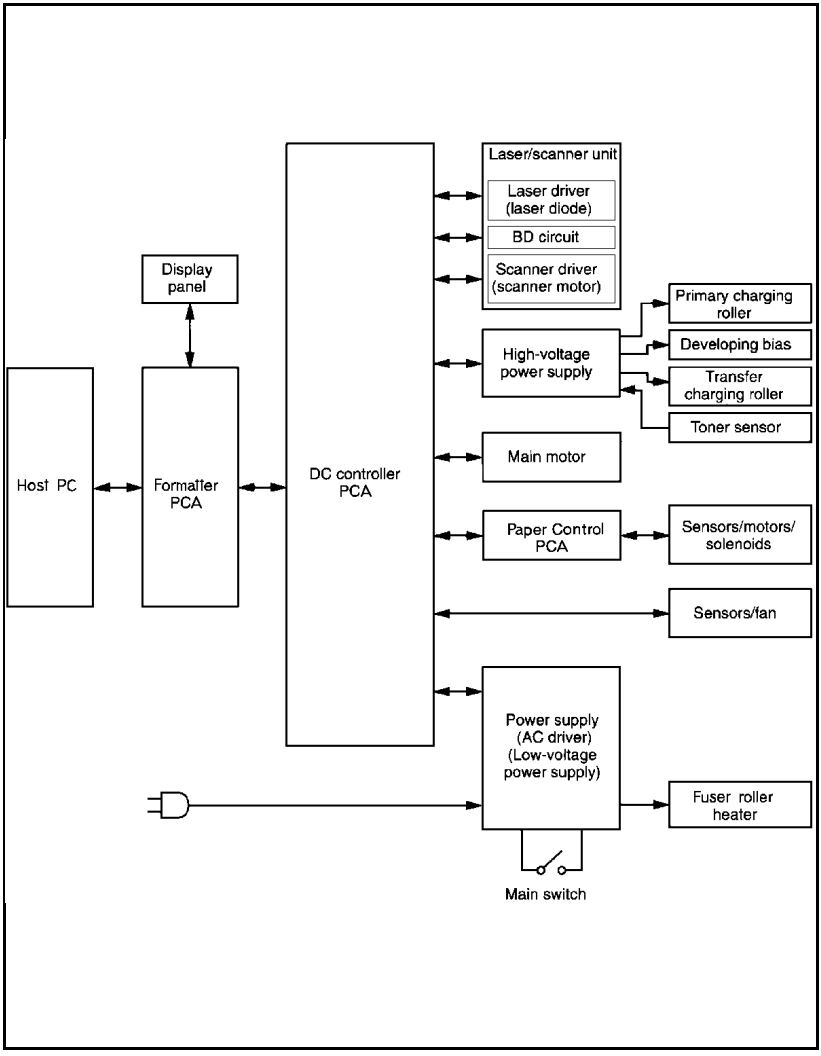



Figure 5-1 DC Controller Loads

## Serial Data Communication

The printer communicates with and controls the Paper Feeder, the Lower Cassette Assembly, and the Envelope Feeder through serial data lines SLI and SLO. In addition, the DC Controller uses information encoded on SLI from the High Voltage Transformer to monitor the toner level.

Communicating with the various subassemblies of the printer through serial data lines allows many of the functions of the processor on the DC Controller to be off-loaded to local State Machines on the subassemblies. The DC Controller uses data line SLI to receive status information (such as Ready, or Paper Out) from the subassemblies. Data line SLO is used to issue commands or to request status.

The State Machines on the subassemblies operate on a clock synchronous to the DC Controller processor. The printer serial data lines use serially encoded data protocol to receive and send information.

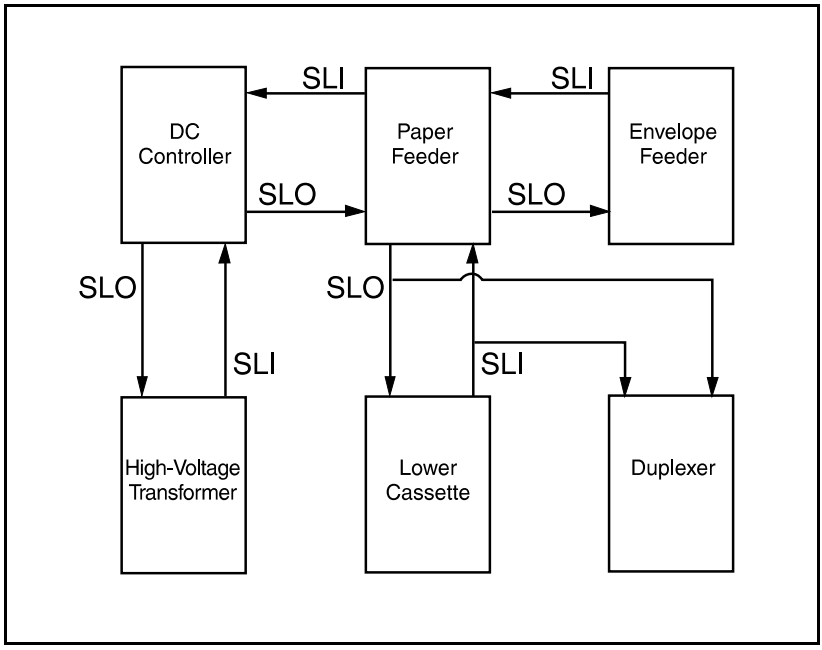



**Figure 5-2 Serial Data Flow**

## Solenoids

Solenoids are controlled by the DC Controller. Each solenoid drives a specific roller (see Table 5-1). The DC Controller outputs +24B VDC to energize the solenoids at the proper time. When either of the doors are open, the +24B VDC is removed and the solenoids are disabled.

**Table 5-1** Solenoid Signals

| Solenoid | Description | PCA |
|---|---|---|
| SL1 | PC tray (Tray 2) Pickup Roller Clutch Solenoid | Paper Control PCA (J704) |
| SL2 | Multi-purpose (MP) Tray (Tray 1) Pickup Roller Clutch Solenoid | Paper Control PCA (J702) |
| SL3 | Lower Cassette (LC or Tray 3) Pickup Roller Clutch Solenoid | Lower Cassette (J853) located in Lower Cassette Drive Assembly. See Chapter 8 for location. |

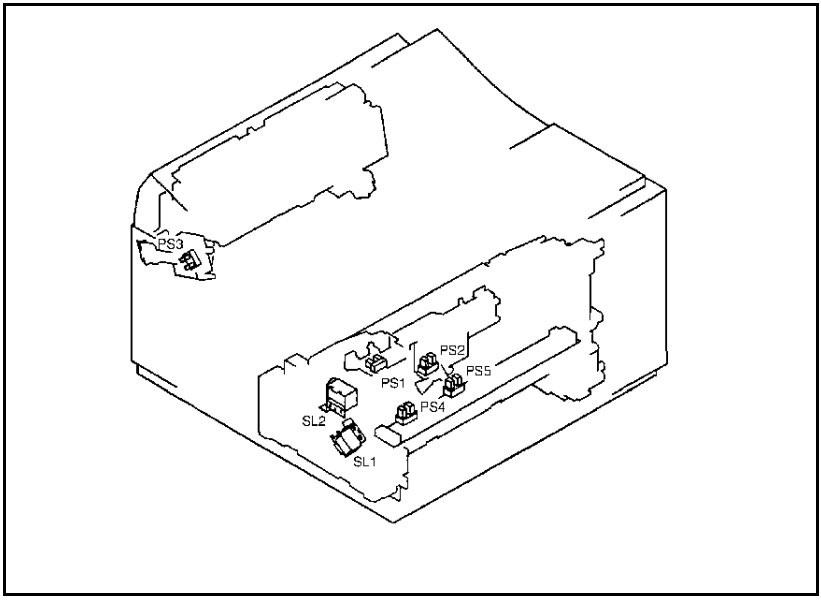



**Figure 5-3** Printer Solenoid and Photosensor Locations

## Photosensors

Photosensors, monitored by the DC Controller, are responsible for detecting the presence of paper, paper motion, and timing. (See Table 5-2.) Photosensor PS2 senses paper in the PC tray; photosensor PS4 senses paper in the MP tray. The message PC LOAD or MP LOAD is displayed when either the PC tray or the MP tray is selected as the primary tray and is out of paper. PS6 and PS7 (respectively) sense the presence of paper in the Lower Cassette and the Envelope Feeder. Paper must be loaded into the primary paper tray before printing can resume. The message PC EMPTY or MP EMPTY is displayed when either the PC tray or the MP tray is out of paper and is not selected as the primary paper tray. LC EMPTY or EE EMPTY is displayed when the Lower Cassette or the Envelope Feeder is empty. The EMPTY message is only a reminder that the paper tray is empty; it is not necessary to load paper to continue printing from another tray.

The Paper Control PCA, Lower Cassette Assembly, and the Envelope Feeder communicate with the DC Controller through serial data lines. The condition of the printer engine photosensors PS2, PS4, PS5, the optional Lower Cassette PS6, and the optional Envelope Feeder PS7 is encoded into a digital logic stream and read by the DC Controller on line SLI.

PS1 detects paper at the Input Feed Roller and is used in jam detection and registration. PS3 detects the presence of paper in the Fuser Assembly, and is used in jam detection. PS5 terminates laser operation when it detects the end of the sheet. This allows the printer to print images on odd-sized media fed from the MP tray without contaminating the Transfer Roller.

**Note** The LaserJet 5 printer uses different tray designators and associated messages as follows.

| LJ 4 / 4 Plus | LJ 5 |
|---|---|
| MP Tray | Tray 1 |
| PC Tray | Tray 2 |
| LC Tray | Tray 3 |
| MP/PC/LC LOAD | TRAY x LOAD (x=1,2, or 3) |
| MP/PC/LC EMPTY | TRAY x EMPTY (x=1,2, or 3) |

**Table 5-2** Photosensor Signals

| Sensor | Description | PCA |
|---|---|---|
| PS1 | Input/Registration Sensor - detects paper in pickup area | Paper Control PCA (J605) |
| PS2 | PC tray (Tray 2) Paper-out Sensor - detects the presence of paper in the PC tray. | Paper Control PCA (J605) |
| PS3 | Output/Fuser Exit Sensor - detects paper in fuser. | DC Controller (J208) |
| PS4 | MP Tray (Tray 1) Paper Out Sensor - detects the presence of paper in the MP tray (Tray 1). | Paper Control PCA (J701) |
| PS5 | MP Tray (Tray 1) paper end - detects the trailing edge of paper fed from the MP tray (Tray 1). | Sensor PCA (J702) |
| PS6 | Optional Lower Cassette (LC or Tray 3) Paper-out Sensor - detects the presence of paper in the 500-sheet feeder. See Chapter 8 for location. | Paper Control PCA (J603) |
| PS7 | Optional Envelope Feeder Paper-out Sensor - detects the presence of paper in the envelope feeder. See Chapter 8 for location. | Paper Control PCA (J604) |

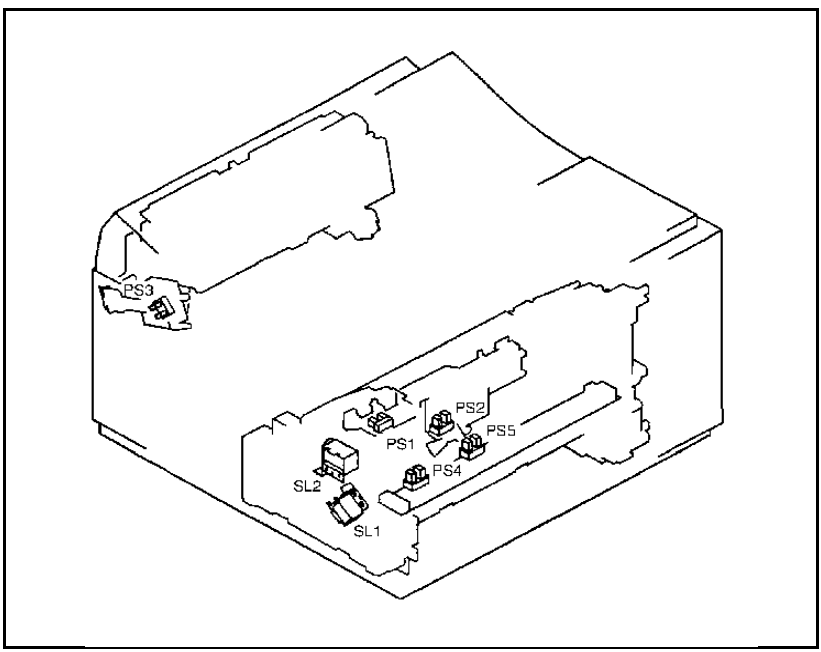



**Figure 5-4** Photosensor Locations

## Microswitches

All microswitch conditions are monitored by the DC Controller over serial data lines SLI and SLO. The State Machines on the individual control PCAs, (for example the Paper Control PCA) convert the switch condition to a digital logic level, and encode that information on the data stream for the DC Controller to use.

**SW601** (Door Open Sensing switch) monitors the top cover. If the top cover is open, the printing process stops and the `12 PRINTER OPEN` message is displayed. SW601 disables the +24V (B) voltage, so the printer goes through the warm-up cycle after the cover is closed.

**SW602** (Test Print switch) is labeled and located under the MP tray (Tray 1) door on the right edge of the door opening. The Print Engine Test isolates the entire printer from the Formatter PCA. Press the Test Print switch once to start the Print Engine Test. The Print Engine Test is a good method for finding whether print problems are associated with the DC Controller or the Formatter PCA.

Paper tray size microswitches are activated by protrusions on each PC tray (Tray 2). The tray size is determined by the combination of engaged microswitches (see Table 5-3 and 5-4).

**SW 603, 604, 605** (Cassette Size Switches) are for the PC tray (Tray 2), and **SW 851, 852, 853** are for the 500-sheet Lower Cassette (Tray 3). These microswitches work together to indicate to the DC Controller which size cassette is installed, or indicate that the cassette is incorrectly installed. The combinations for each cassette size are listed in Table 5-4.

**Table 5-3** Microswitch Signals

| Switch | Description | PCA |
|---|---|---|
| SW601 | Door Open Sensing Switches (front and rear) | Paper Control PCA |
| SW602 | Test Print Switch | Paper Control PCA |
| SW603 | PC tray (Tray 2) Size Sensing Switches | Paper Control PCA |
| SW604 | PC tray (Tray 2) Size Sensing Switches | Paper Control PCA |
| SW605 | PC tray (Tray 2) Size Sensing Switches | Paper Control PCA |
| SW851 | Lower Cassette (Tray 3) Size Sensing Switches | Lower Cassette |
| SW852 | Lower Cassette (Tray 3) Size Sensing Switches | Lower Cassette |
| SW853 | Lower Cassette (Tray 3) Size Sensing Switches | Lower Cassette |

## PC (Tray 2) and LC (Tray 3) Tray Size Sensing System

Trays inserted into the printer trigger specific microswitches, which define the tray size (see Table 5-4). Refer to Figure 7-1 for location.

**Table 5-4** Switch Settings for PC (Tray 2) and LC (Tray 3) Trays

| Tray Size | SW603 (Upper) | SW604 (Middle) | SW605 (Lower) |
|---|---|---|---|
| Letter | ON | OFF | ON |
| Legal | ON | ON | OFF |
| A4 | OFF | OFF | ON |
| Executive | OFF | ON | ON |
| Tray Not Installed | OFF | OFF | OFF |

## Motors

The DC Controller controls the Exhaust Fan, the Main Motor, and the Laser/Scanner Motor. The remaining motors and solenoids are controlled by State Machines on the motor's assembly. The condition of these motors and solenoids is monitored by the DC Controller through serial data lines.

The Main Motor (M1) rotates after any printer door is opened and closed, during the Warm-up period, the Initial Rotation period, the Print period, or the Last Rotation Period. The Scanner Motor (M5) is controlled and monitored by the DC Controller PCA. M5 operates during the Initial Rotation period, the Print period, and the Last Rotation period.

The Paper Feed Assembly Drive Motor (M2) runs during the Print Period. This motor provides the drive to pick paper from the PC tray, and deliver it to the Input/Registration Sensor (PS1). The LC Assembly Motor (M3) provides the drive to pick paper from the optional 500-sheet Lower Cassette, and deliver it to the Input/Registration Sensor (PS1). M3 is mounted on the 500-sheet Lower Cassette. The Envelope Feeder Drive Motor (M4) provides the drive to pick envelopes from the envelope feeder and deliver them to the Input/Registration Sensor (PS1). M4 is mounted on the optional Envelope Feeder.

The Exhaust Fan Motor (FM1) is controlled and monitored by the DC Controller PCA. The Exhaust Fan Motor operates at low-speed during the Warm-up period, Standby period, and during PowerSave. It operates at high-speed during the Initial Rotation period, the Print period, and the Last Rotation period.

The Paper Feed Assembly Motor (M2) is controlled by the Paper Control PCA. The Paper Feed Assembly Motor drives the pickup rollers through SL1 and SL2. These rollers pick media from either the PC tray (Tray 2) or the MP tray (Tray 1), and deliver the media to the Paper Registration Sensor (PS1).

**Table 5-5** Motors

| Motors | Description |
|---|---|
| M1 | Main Motor (Gear Train Drive Motor) |
| M2 | Paper Input Assembly Drive Motor |
| M3 | 500-sheet Lower Cassette Pickup Motor |
| M4 | Envelope Feeder Drive Motor |
| M5 | Scanner Motor |
| FM1 | Exhaust Fan Motor |

## Paper Jam Detection

The Input/Registration Sensor (PS1) and the Paper Exit Sensor (PS3) detect paper moving through the printer. If a paper jam is detected, the DC Controller PCA immediately stops the printing process and `13 PAPER JAM` or `REMOVE PAPER JAM` message is displayed. A paper jam can be detected under any of the following conditions:

- **Input Paper Delay Jam:** When paper does not **reach** the Input Paper Sensor (PS1) within the required time.
- **Input Paper Stationary Jam:** When paper does not **clear** the Input Paper Sensor (PS1) within a specified time.
- **Paper Exit Delay Jam:** When paper does not **reach** the Paper Exit Sensor (PS3) within the required time.
- **Paper Exit Stationary Jam:** When paper does not **clear** the Paper Exit Sensor (PS3) within a specified time.
- **False Paper Jam:** If the Rear Door is open, a paper jam message is displayed because PS3 senses a jam.

**Note** A defective PS5 (Paper End Sensor) can also cause a paper jam when paper is fed from the MP Tray (Tray 1).

# Formatter System

The formatter is responsible for the following:

- Receiving and processing ASCII data from printer interfaces.
- Monitoring front panel input and relaying printer status information (through the front panel and bi-directional I/O).
- Developing/coordinating data placement and timing with the print engine.
- Storing font information.
- Communicating with the host computer.

The Formatter PCA can be divided into three functional areas:

- I/O Control
- Memory/Memory Management
- Data Processing

| Formatter Feature | LaserJet 4 | LaserJet 4+ | LaserJet 5 |
|---|---|---|---|
| Processor | 20 MHz 80960KA | 25 MHz 80960KB | 33 MHz 80960JF |
| REt | Yes | Yes | Yes |
| MEt | No | Yes | Yes |
| Economode | No | Yes | Yes |
| Configurable I/O Buffer Size | No | Yes | Yes |
| Personality Resource Saving | No | Yes | Yes |
| PowerSave Mode | No | Yes | Yes |
| Font Cartridge Slot | Yes | Yes | No |
| MIO Interface Level | 5.0 | 5.1 | 6.0 |
| Serial Ports | RS-232/422 | RS-232 | RS-232 & SIR |
| Parallel Port | Bitronics | IEEE-1284 Bitronics | IEEE-1284 Bitronics |
| Maximum RAM (PCL/PS) | 34/22 MB | 66/50 MB | 66/52 MB |
| SIMM Support | RAM/ROM | RAM/ROM | RAM/ROM/Flash |
| PCL Level | 5 | 5E | 6 |
| On-Board Fonts | 35 Intellifont/10 TT Line Printer | 35 Intellifont/10 TT Line Printer | 45 TT & Dark Courier Line Printer |
| Default Symbol Set | Roman-8 | Roman-8 | PC-8 |
| Paper Size Support | Letter/Legal/A4/Exec | Letter/Legal/A4/Exec | Letter/Legal/A4/Exec/A5 |
| MP (Tray 1) Modes | First, Manual, Cassette | First, Manual, Cassette | First, Cassette |
| Grayscale Hardware Assist | No | No | Yes |
| ROPS 3 Hardware Assist | No | No | Yes |
| Intuitive Control Panel | No | No | Yes |

## I/O Control

The formatter I/O control is responsible for maintaining communications with the host system(s). The printer has three interfaces; serial, parallel (bitronic), and Modular I/O (MIO). The formatter maintains connections with hosts connected to these I/O's including accepting data handshaking, and returning status.

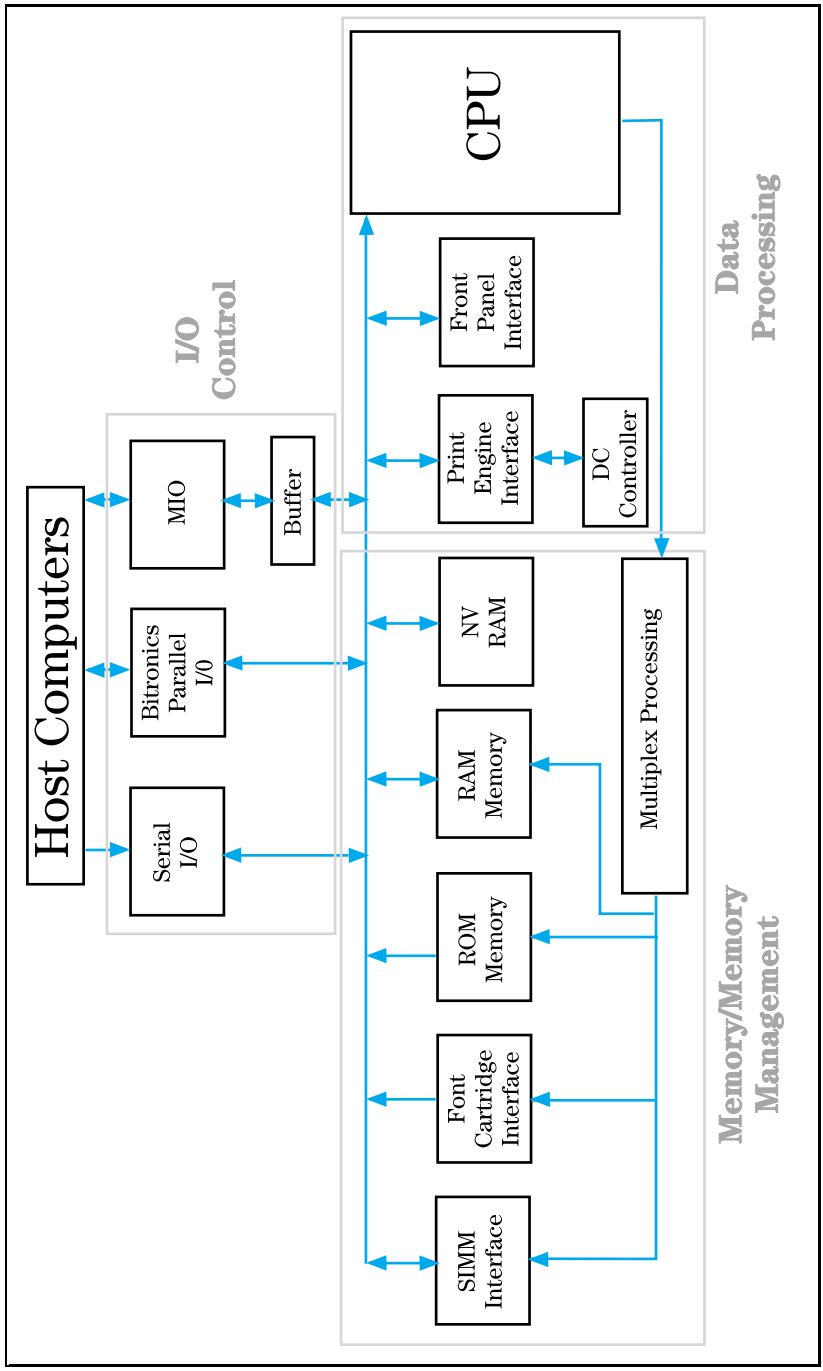



**Figure 5-5 Formatter PCA—Functional Areas**

## Memory Management

The printer uses several different types of memory. This memory can be divided into two different categories, Read Only Memory (ROM) and Random Access Memory (RAM). ROM memory consists of the memory located on the Formatter PCA and any font cartridges that may be installed in the printer. RAM memory consists of RAM memory resident on the Formatter PCA, SIMM memory installed in the printer, and the Non-Volatile Memory (NVRAM) located on the Formatter PCA.

In general, the ROM is responsible for storing the instructions for the operation of the processor and font information. The RAM memory is used to store temporary information that will be used by the printer for a particular print job or a series of print jobs. This could consist of soft fonts, macros or graphics patterns. RAM memory is also used by the printer to store data that is being processed into the raster image that will control the laser and create the printed page.

The NVRAM is used to store printer configuration information that can be input from the printer front panel. This information stored in NVRAM will remain resident in the printer even if the power to the printer is turned off.

## Data Processing

The formatter CPU is responsible for the overall control of all functions related to the formatter. One of the CPU's main functions is to maintain communication with the print engine. This is done by the print engine interface and the DC Controller PCA. The DC Controller PCA monitors all print engine functions such as fuser temperature and paper jam status. The print engine status is communicated by the DC Controller to the formatter CPU by the print engine interface. The CPU also controls the process that converts ASCII data received from the host into the raster data. This raster data is sent to the laser scanner assembly via the DC Controller.

Finally the CPU comunicates printer status to the user through the control panel via the front panel interface. The front panel interface also transmits front panel inputs to the CPU.

## PJL Overview

Printer Job Language (PJL) is an integral part of configuration, in addition to the standard Printer Command Language. With standard I/O cabling, PJL allows the printer to perform functions such as:

- Allowing the printer to talk to the host computer through a Bi-directional parallel connection. The printer can tell the host such things as the control panel settings, and allow the control panel settings to be set from the host.
- Dynamic I/O switching allows the printer to be configured with a host on each I/O. The printer can receive data from any I/O simultaneously.
- Context-sensitive switching allows the printer to recognize automatically the personalities (PostScript or PCL) of each host and configure itself to serve that personality.
- PJL can act as a spooler to print only sections of a print job as defined from the software.
- PJL allows any print job to be protected from the effects of the previous print job. If a print job is sent to the printer in landscape mode, the subsequent print jobs print in landscape only if they are formatted for landscape printing.

# Image Formation System

Laser printing requires the interaction of several different technologies (such as electronics, optics, and electro-photographics) to provide a printed page. Each process functions independently and must be coordinated with all other printer processes. The image formation process centers around the photosensitive drum and consists of six stages:

**1. Cleaning**
**2. Conditioning**
**3. Writing**
**4. Developing**
**5. Transferring**
**6. Fusing**

The toner cartridge houses the cleaning, conditioning, and developing stages of the electro-photographic (EP) process. Components of the image formation system that wear, degrade, or are consumed are built into the replaceable cartridge. The toner cartridge contains the photosensitive drum, primary charging roller, developing station, toner cavity, and cleaning station. This eliminates the need for a service call when replacement is required.

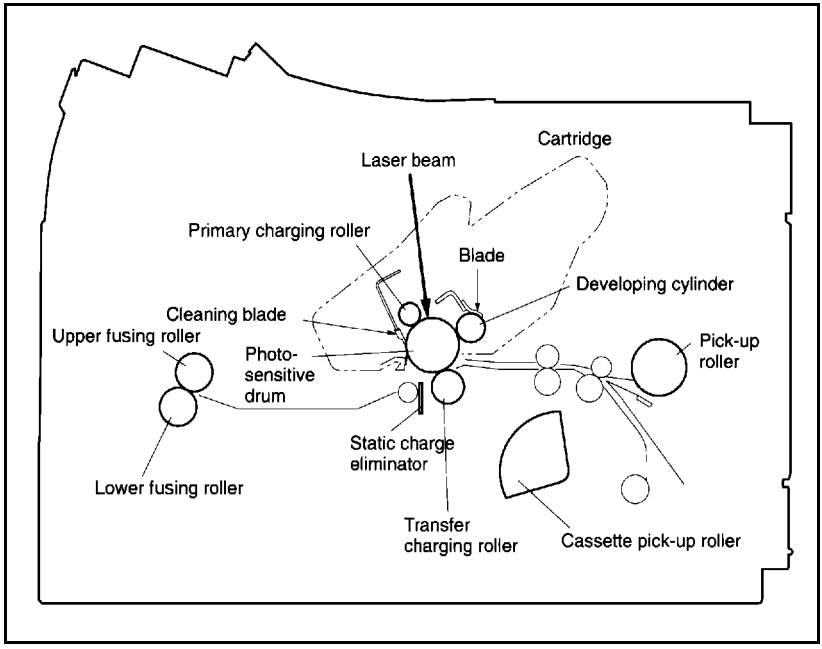



**Figure 5-6 Image Formation System**

## Photosensitive Drum

The photosensitive drum is the “heart” of the Image Formation System. The special properties of this drum allow an image to be formed on the drum’s surface and then transferred to paper. The drum is an extruded aluminum cylinder. The outside of the cylinder is coated with a layer of organic-photoconductive material (OPC) which is non-toxic. The aluminum base of the photosensitive drum is electrically connected to ground potential (see Figure 5-7).

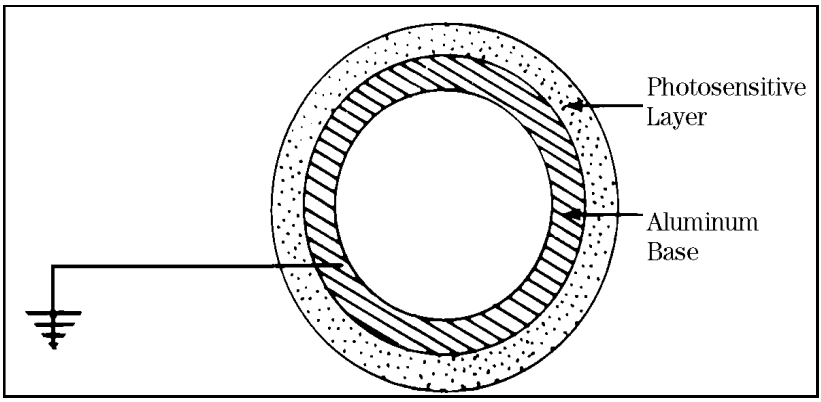



**Figure 5-7 Photosensitive Drum**

### Drum Sensitivity

The OPC material has properties similar to a photo-resistor. It becomes electrically conductive when exposed to light. When the photosensitive drum is exposed to light, the negative charges deposited on it are conducted to the ground potential of the drum’s base. Areas not exposed to light remain nonconductive and maintain their negative charge.

**Caution** Do not expose the Toner Cartridge to any bright light source. Too much light permanently damages the drum.

## Cleaning Stage

During the cleaning stage of the image formation process, the drum's surface is physically cleaned, preparing it to hold an image. During printing, the drum is rotating constantly making several complete rotations per printed page. Before forming the image for a given section of print, a cleaning blade removes toner from the previous rotation of the drum. The excess toner is stored in the toner cartridge where it is prevented from being used in later print jobs.

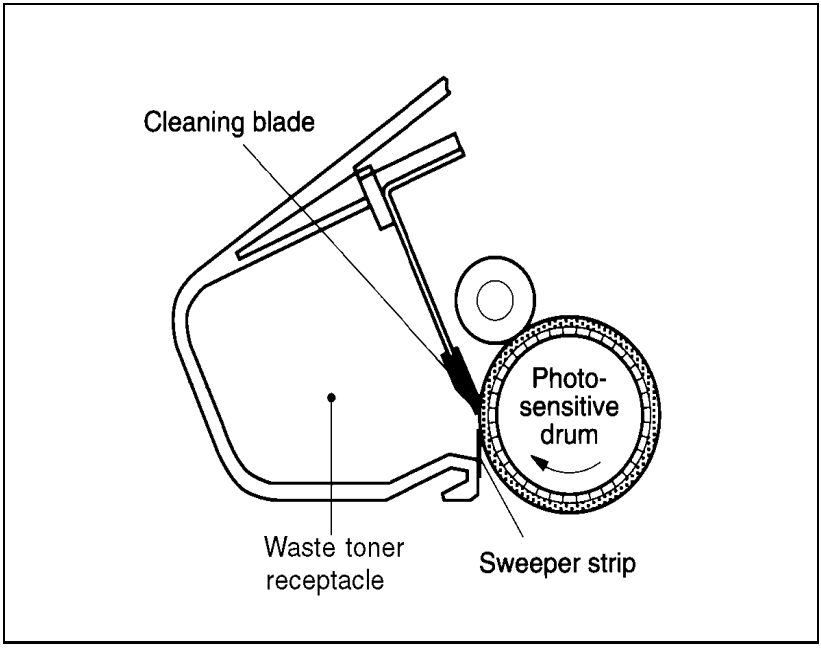



**Figure 5-8 Drum Cleaning Station**

## Conditioning Stage

After the drum is physically cleaned, it must be conditioned. This process consists of applying a uniform negative charge on the surface of the drum with the primary charging roller, located in the toner cartridge. The primary charging roller is coated with conductive rubber with an AC bias applied to erase any residual charges and maintain a constant drum surface potential. In addition, a negative DC bias is applied by the charging roller to create a uniform negative potential on the drum's surface. The amount of DC voltage is modified by the print density setting from the Control Panel.

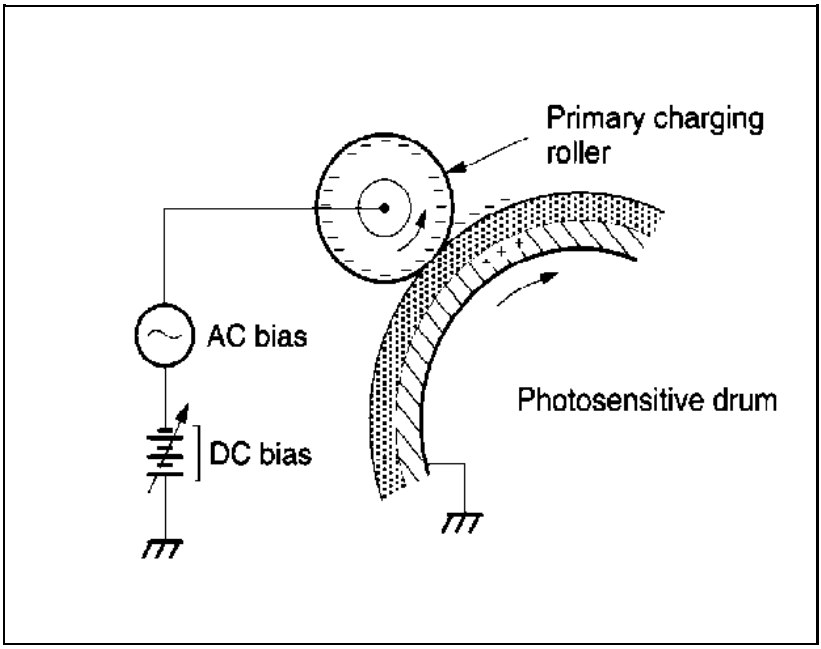



**Figure 5-9 Primary Charging Roller**

## Writing Stage

At the writing station, the laser beam is used to discharge the drum's negative potential by focusing laser light onto areas of the photosensitive drum. This creates a latent electrostatic image, which later is developed into a visible image.

Laser light is produced by a small modulated laser diode. The beam created by the diode shines onto a rotating polygonal mirror. As the mirror rotates, the beam reflects off the mirror and sweeps the page from left to right (see Figure 5-10).

A set of lenses and mirrors focuses the horizontal sweeping beam through the laser beam access slot in the rear of the toner cartridge, and onto the photosensitive drum. Because the beam is sweeping the entire length of the drum and the drum is rotating, the entire circumference of the drum can be covered. The speed of the scanner motor (which turns the scanning mirror) and the speed of the main motor (which turns the drum) are synchronized, and each successive sweep of the beam is offset 1/600th of an inch. The beam can be turned on and off to place a dot of light every 1/600th of an inch in the horizontal direction. This is how the printer achieves its 600 x 600 DPI resolution.

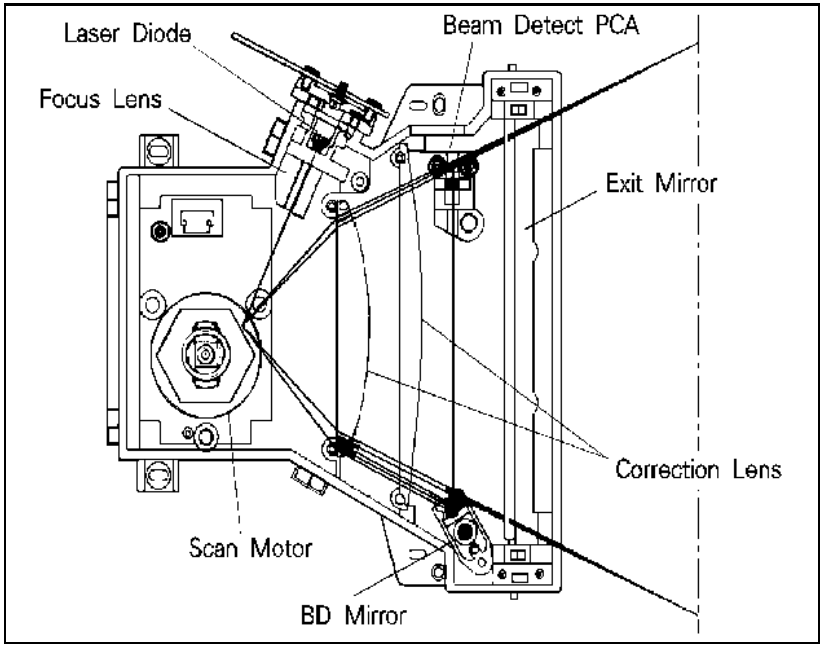



**Figure 5-10 Image Writing**

At the beginning of each sweep (before the beam reaches the drum), the beam is reflected off the beam detect mirror. The momentary pulse of light is sent to the DC Controller, where it is converted to an electrical signal used to synchronize the output of data (VDO) for one sweep (scan line). This pulse, referred to as the Beam Detect signal (BD), is used to diagnose problems with the laser diode or scanner motor also.

After the writing station, the drum surface has an invisible (latent) electrostatic image. Portions of the drum not exposed to the laser are still at the uniform negative potential (placed there by the primary charging roller), but those portions exposed to light have been discharged to ground, to form the latent electrostatic image.

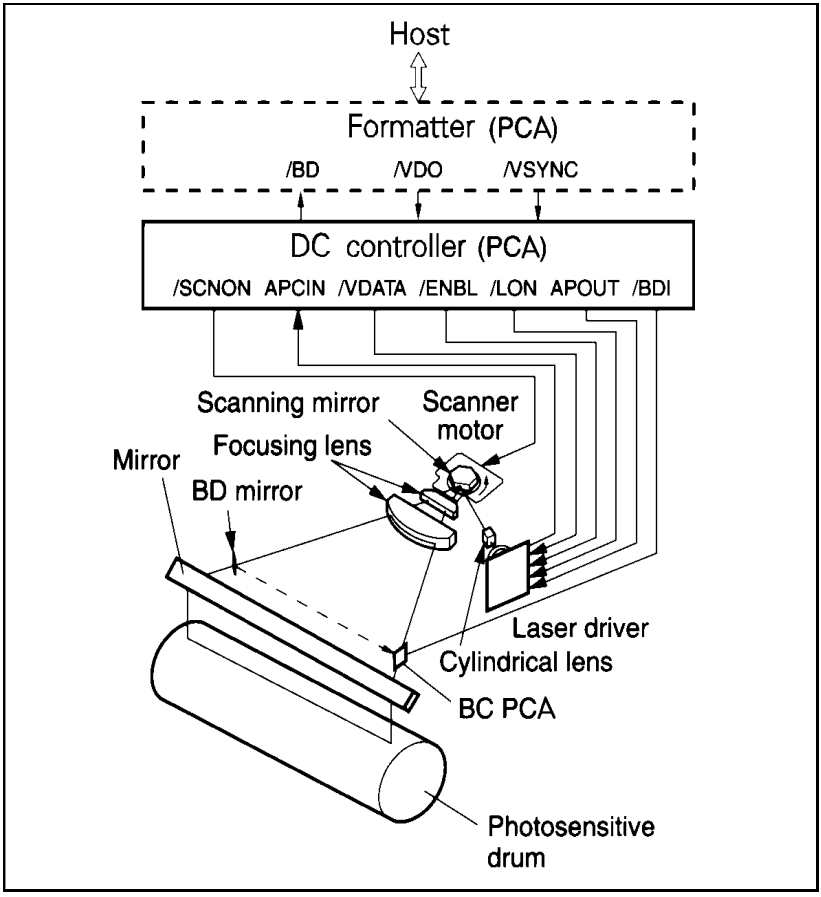



**Figure 5-11 Drum Signals**

## Developing Stage

The developing station develops the latent electrostatic image into a visible image on the drum. The developing unit consists of a metallic cylinder that rotates around a fixed magnetic core inside the toner cavity. Toner is a powdery substance made of black plastic resin bound to iron particles, which is attracted to the magnetic core of the cylinder. A rubber blade “brushes” the toner on the developing cylinder to a uniform thickness.

The toner particles obtain a negative surface charge by rubbing against the developing cylinder which is connected to a negative DC supply. The negatively charged toner is attracted to the discharged (grounded) areas of the drum exposed to laser light, and repelled from the negatively charged (non-exposed) areas. An AC potential is applied to the developing cylinder to decrease the attraction between the toner and the magnetic core of the cylinder, and to increase the repelling action of toner against the areas of the drum not exposed to laser light. This AC potential improves density and contrast.

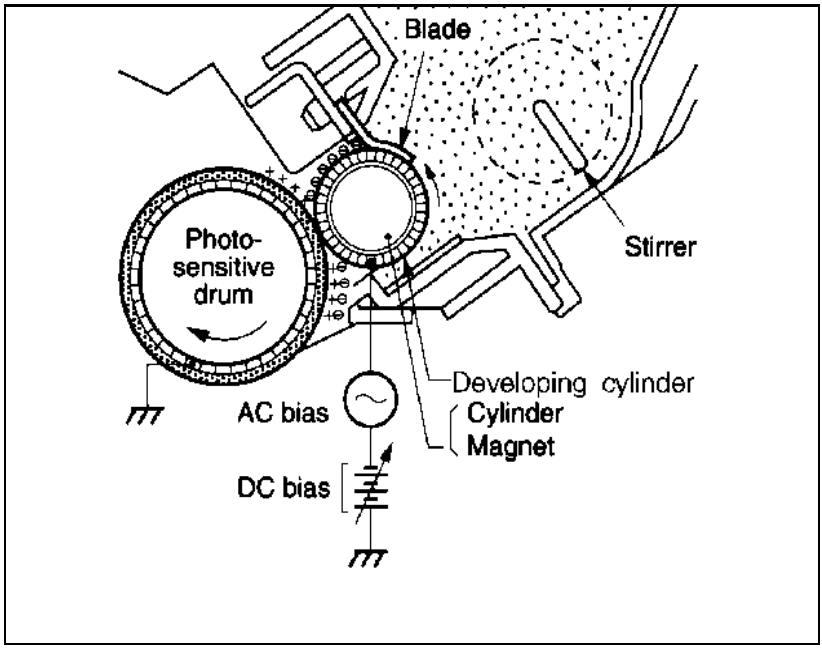



**Figure 5-12 Image Development**

The DC bias of the developing cylinder is adjusted to change the force of attraction between the toner and drum by changing the print density setting from the control panel. A change in DC bias causes either more or less toner to be attracted to the drum, which in turn either increases or decreases the print density. The print density variation is approximately ±10% (see Figure 5-13). Both the primary and developer DC bias voltages are changed in response to the density setting.

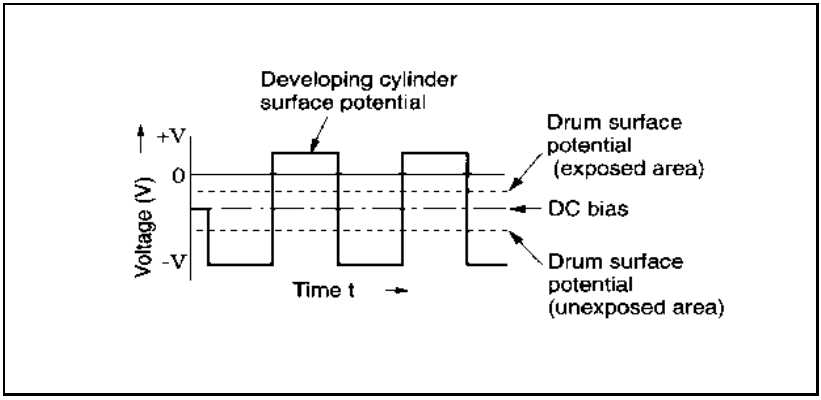



**Figure 5-13 Developing Potentials**

## Transferring Stage

At the transferring station, the toner image on the drum's surface is transferred to the paper. A positive charge applied to the back of the paper by the transfer roller causes the negatively charged toner on the drum's surface to be attracted to the page.

The small radius of the drum and the stiffness of the paper peel the paper away from the drum. The static charge eliminator also helps separate the paper from the drum. The static charge eliminator weakens the attractive forces between the negatively charged drum surface and the positively charged paper. Without this help, thin paper can wrap around the drum. After separation, the paper moves to the fusing station and the drum rotates to the cleaning and conditioning stations.

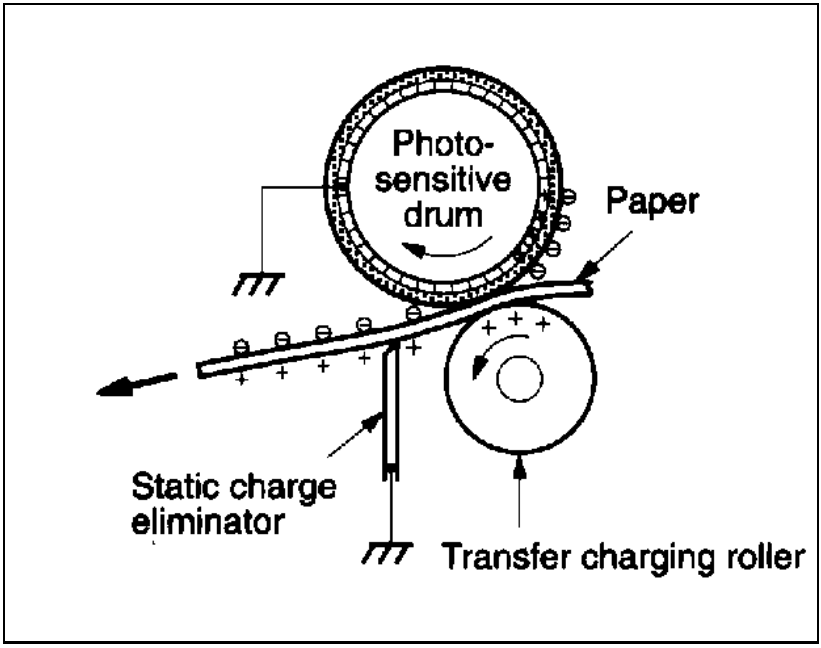



**Figure 5-14 Transfer of the Toner Image and Paper Separation**

## Fusing Stage

At the fusing station, the toner is fused into the paper by heat and pressure to produce a permanent image. The paper passes between a heated fusing roller and a soft pressure roller. This melts the toner and presses it into the paper. To keep the toner or paper from sticking, the upper fusing roller is covered with a non-stick, “Teflon-type” sleeve. The fusing roller contains an halogen quartz lamp that provides heat for the fusing process.

The fusing roller temperature is monitored by the DC Controller PCA, using a thermistor (TH1). The DC Controller maintains a temperature of about 172° C during standby mode and 183° C during print mode. If the fusing system overheats (exceeds 230° C), a thermoswitch opens the power circuit to the fusing heat lamp, and a `50 SERVICE` message is displayed.

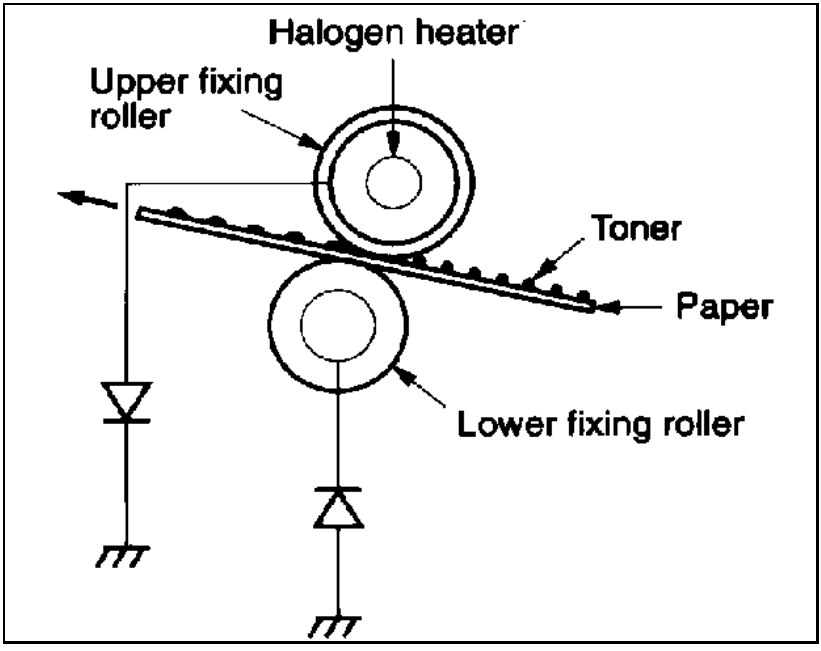



**Figure 5-15 Fusing the Toner to the Paper**

# Paper Feed System

**Note** The LJ 5 printer designators differ as follows.

| | | | |
|---|---|---|---|
| LJ 4 / 4 Plus | Multipurpose (MP) Tray | Paper Cassette (PC) Tray | Lower Cassette (LC) Tray |
| LJ 5 | Tray 1 | Tray 2 | Tray 3 |

The following paper paths are described in this section of the manual:

- **PC Tray (Tray 2) to Output Trays**
- **MP Tray (Tray 1) to Output Trays**

The paper feed system is responsible for picking paper from either the PC tray (Tray 2) or MP tray (Tray 1) and delivering it to the image formation system, feeding it into the fusing station, and delivering the paper to the output tray (see Figure 5-16).

The Paper Feed Assembly is a modular, replaceable paper-feeder mechanism which allows media to be input from either of four sources. The four paper input sources of the printer are:

- The MP Tray (Tray 1)
- The PC Tray (Tray 2)
- The Lower Cassette (Tray 3)
- The Envelope Feeder

Each input has features which makes it the best choice for various applications. For instance, short media and heavy stock can be fed from the MP tray (Tray 1) because it senses media length and has a relatively straight paper path. Large print jobs can be fed reliably from the optional Lower Cassette (Tray 3).

The Paper Feed Assembly contains a state machine which monitors input sensors and generates commands for the solenoids and motors on the Paper Feed Assembly. In addition, the Paper Feed Assembly communicates with the DC Controller through serial data lines. An illustration of this is M2, the Paper Feed Motor. M2 is controlled solely by the Paper Feed Assembly state machine. M2 begins rotation when the State Machine receives the correct set of conditions from its inputs and the serial data lines. M2 stops rotation when the Input Registration sensor (PS1) reports the presence of paper to the State Machine. The State Machine outputs the presence of paper to the DC Controller through the serial data line.

The Paper Feed Assembly performs horizontal registration of the print media through the Oblique Rollers. As the print media passes through the Oblique Rollers, the media is moved uniformly to the left side of the print path. The movement ensures that each print image is oriented properly on the horizontal axis.

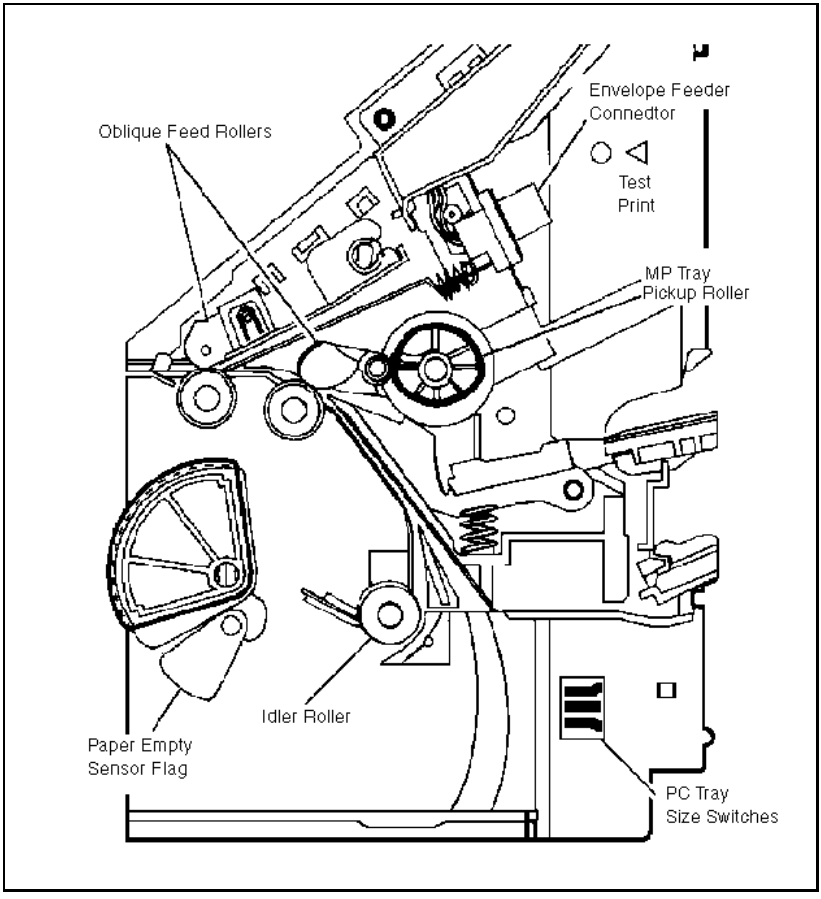



**Figure 5-16 Input Paper Feed System Diagram**

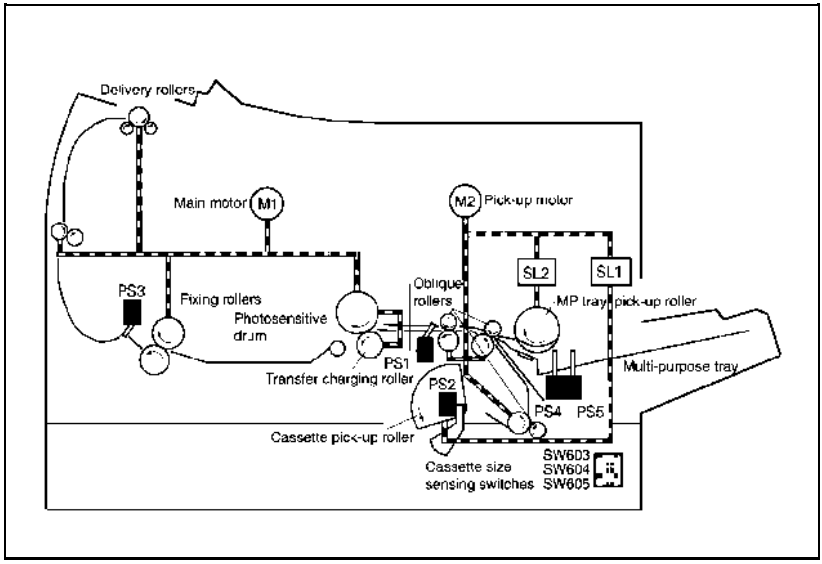



**Figure 5-17 Paper Feed Assembly (Sectional View)**

**Table 5-6**

| Part | Description |
|---|---|
| PS1 | Leading Edge Registration Sensor |
| PS2 | PC Tray (Tray 2) Paper Out Sensor |
| PS3 | Exit Sensor |
| PS4 | MP Tray (Tray 1) Paper Out Sensor |
| PS5 | MP Tray (Tray 1) Paper End Sensor |
| SL1 | Cassette (Tray 2) Pickup Roller Clutch Solenoid |
| SL2 | MP (Tray 1) Tray Pickup Roller Clutch Solenoid |

## Printing from the MP Tray (Tray 1)

MP tray selection is provided by the Formatter PCA, as configured by the operator's control panel or by a software application. The MP tray (Tray 1) feed system's paper motion begins when the DC Controller PCA, after receiving a PRNT signal, starts the Scanner Motor (M5) and the Main Motor (M1). When the fusing roller reaches the minimum operating temperature (183° C), the MP pickup roller clutch solenoid (SL2) is energized for 1 second, allowing the MP pickup roller to make one rotation. Clutches and solenoids work together to start and stop gears and rollers used for paper movement. The MP pickup roller then feeds a sheet of paper from the MP tray (Tray 1).

The Formatter PCA sends the $\overline{\text{VDO}}$ signal to the print engine within a specific time period after the paper reaches the Input/Registration Paper Sensor (PS1). This aligns the leading edge of the toner image on the photosensitive drum with the leading edge of the paper. After the paper passes the drum and the fusing rollers, it triggers the Paper Exit Sensor (PS3). The paper then is directed to the output tray.

If the paper does not reach or clear each sensor within a specified time, the microprocessor on the DC Controller PCA assumes a paper jam occurred and informs the Formatter PCA.

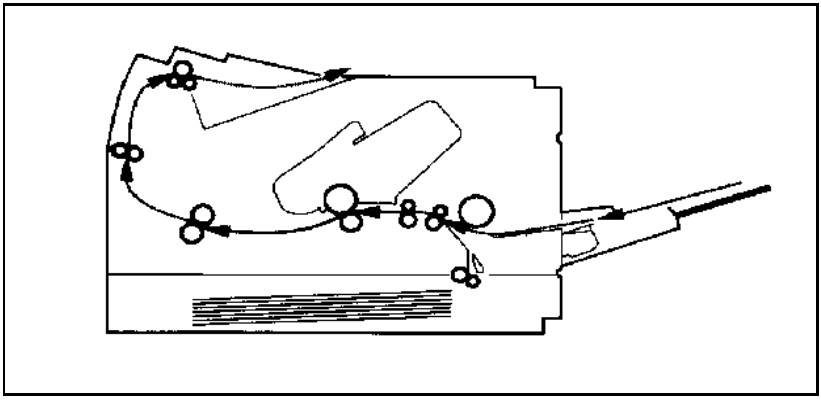


**Figure 5-18 MP Tray (Tray 1) to Output Tray Paper Path**

## Printing from the PC Tray (Tray 2)

PC tray selection is provided by the Formatter PCA, as configured by the control panel or by software. When the DC Controller PCA receives a $\overline{\text{PRNT}}$ signal, it starts the Scanner Motor (M5) and the Main Motor (M1). When the fusing roller reaches the minimum operating temperature (approximately 183° C), the PC tray (Tray 2) pickup roller clutch solenoid (SL1) is energized for 1 second, allowing the roller to make one rotation. The PC tray pickup roller then feeds a sheet of paper from the PC tray into the PC tray input feed rollers. The PC tray input feed rollers turn until paper reaches the Input/Registration Sensor (PS1). When the media is sensed at (PS1), the pickup motor (M2) stops and the paper is carried through the remainder of the print path by the Main Motor (M1).

The Formatter PCA sends the $\overline{\text{VDO}}$ signal to the print engine after the paper reaches the Input Paper Sensor (PS1). This aligns the leading edge of the toner image on the photosensitive drum with the leading edge of the paper. After the paper passes the drum and the fusing rollers, it triggers the Paper Exit Sensor (PS3). The paper is then fed into the output tray.

If the paper does not reach or clear each sensor within a specified time, the microprocessor on the DC Controller PCA assumes a paper jam occurred and informs the Formatter PCA.

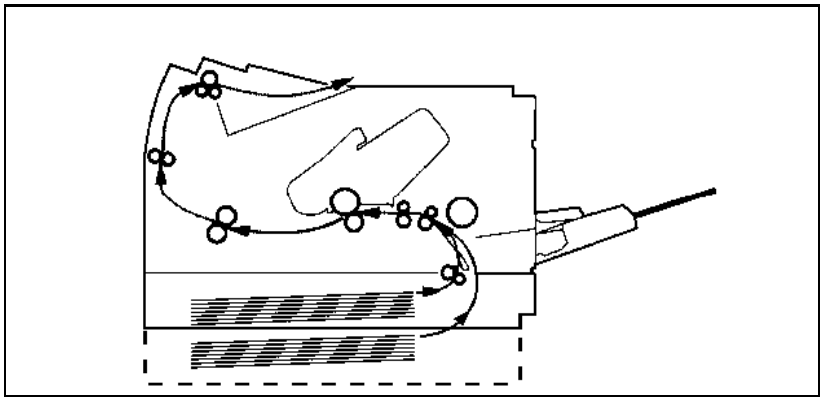


**Figure 5-19** PC Tray (Tray 2) and LC Tray (Tray 3) to Output Tray Paper Path

# Power System

When the main power switch is turned ON, the AC Power Supply provides AC voltage to the DC Power Supply and the fuser assembly heat lamp. The paper path doors must be closed to activate the AC power supply door switches before voltage is provided to the heat lamp.

The DC Power Supply generates +5V DC, and +24V DC for use by the Formatter PCA and the DC Controller PCA. The DC Controller PCA distributes voltages to the remaining electrical assemblies. Over-current protection for the DC Power Supply is provided by a current monitoring circuit (crowbar circuit). To reset the crowbar circuit, the printer's power must be turned OFF for at least ten minutes. The power system block diagram is illustrated in Figure 5-20.

Note that both AC and DC power supplies are contained within the Power Supply Assembly. The high voltage power supply is a discrete assembly located on the underside of the printer.

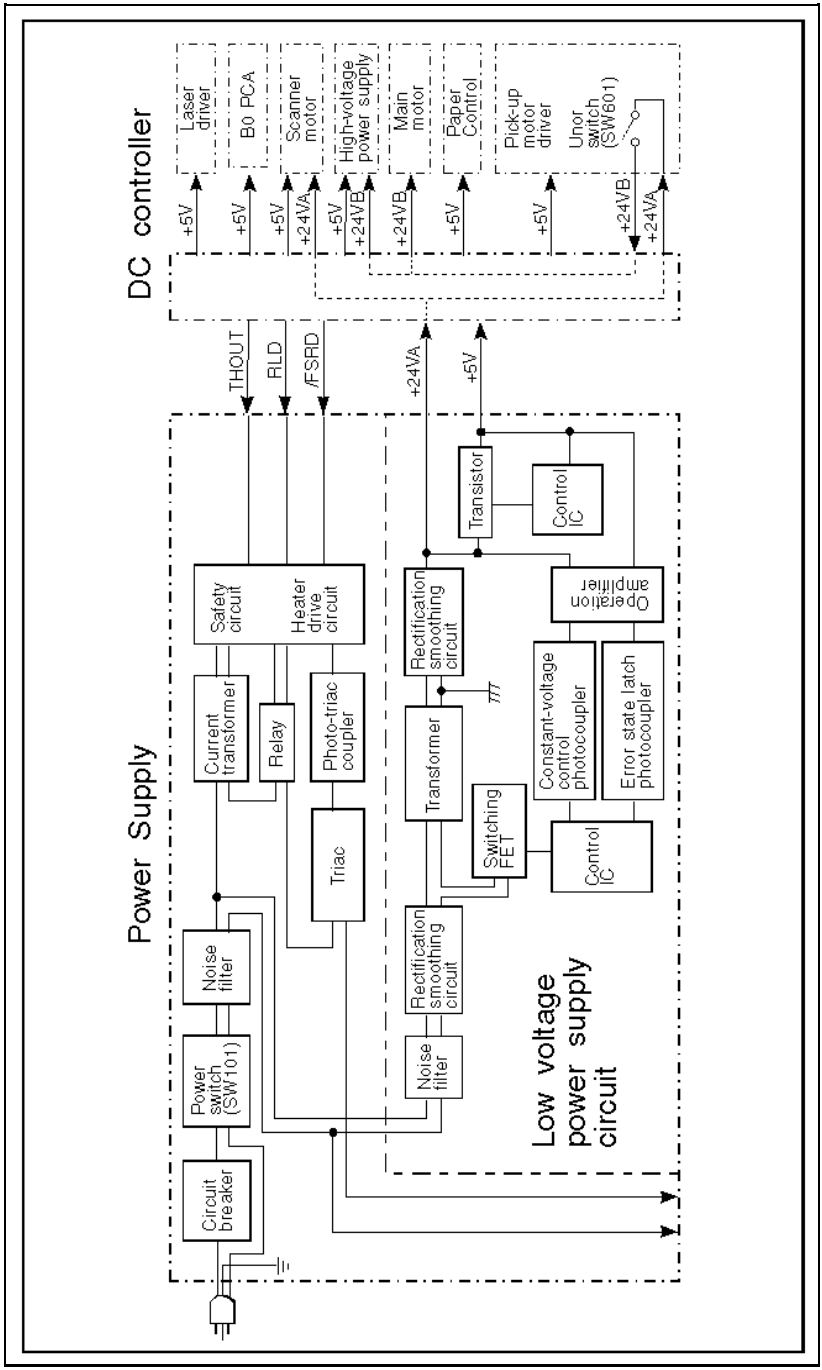



**Figure 5-20 Power System Block Diagram**

# Basic Sequence of Operation

The Formatter PCA and the DC Controller PCA share information during printer operation. Connector J7 on the formatter and connector J207 on the DC controller form a link which operates as a serial data bus. This allows printer status, command information, and dot-image data to be passed between both controllers.

## Standard Printer Operation

The following events take place during normal printer operation:

1. After the printer's power is turned ON, the printer enters the Warmup period.
2. After the printer completes the Warmup period and is ready for operation, the DC controller sends a READY signal (RDY) to the formatter.
3. After the RDY signal is true and print data is ready to be transmitted, the formatter sends a PRINT signal (PRNT) to the DC controller.
4. After the DC controller receives the PRNT signal, the Initial Rotation period begins.
5. At the end of the Initial Rotation period, the DC controller sends a TOP OF PRINT signal (TOP) synchronized with a BEAM DETECT signal (BD) to the formatter. This initiates the Print period.

6 Each time the formatter receives a synchronized $\overline{BD}$ signal from the DC controller, the formatter sends a VIDEO data stream ($\overline{VDO}$) to the DC controller.

7 After the DC controller receives the $\overline{VDO}$ data, the DC controller translates it into a VIDEO OUT signal (VDOUT) that switches the laser diode ON and OFF.

8 The laser beam, created by the laser diode, reflects off the scanner mirror onto the photosensitive drum to form a latent electrostatic image, writing a single line of print (dot) data.

9 After the last $\overline{VDO}$ line of dot data is sent from the formatter, the DC controller checks for another $\overline{PRNT}$ signal from the formatter.

10 *If* another $\overline{PRNT}$ signal is detected, the Print period continues with another page.

11 *If* the DC controller fails to receive a $\overline{PRNT}$ signal before the end of the page passes over the Input/Registration Sensor (PS1), the DC controller initiates the Last Rotation period.

If the printer fails to perform correctly, the DC controller sends an appropriate status to the formatter PCA, and an error is displayed on the printer's control panel.

## Timing Diagrams

The following timing diagram describes the operation of the printers. The "MP Tray Timing Diagram" was developed by running two consecutive prints on A4 paper.

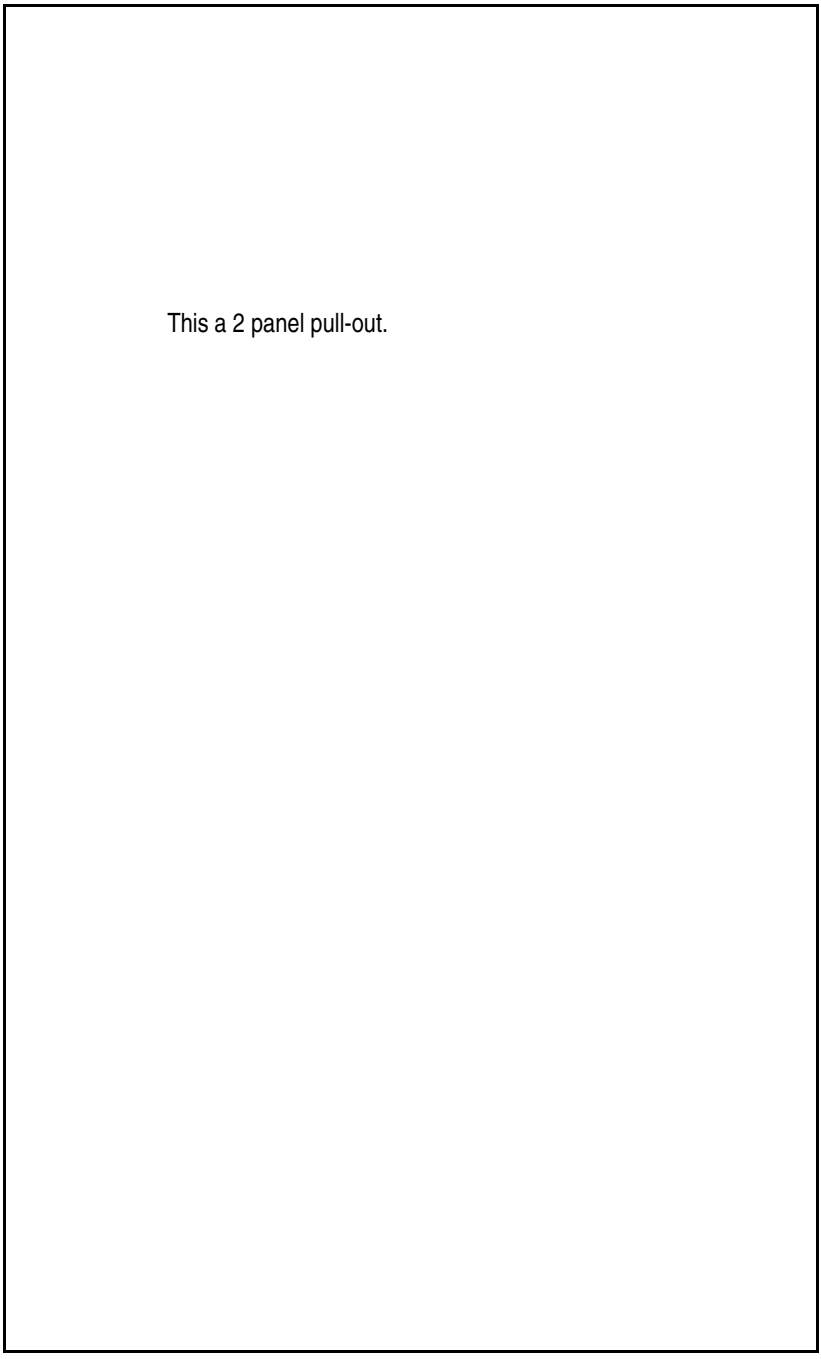



**Figure 5-21 MP Tray Timing Diagram—HP LaserJet 4/4M**

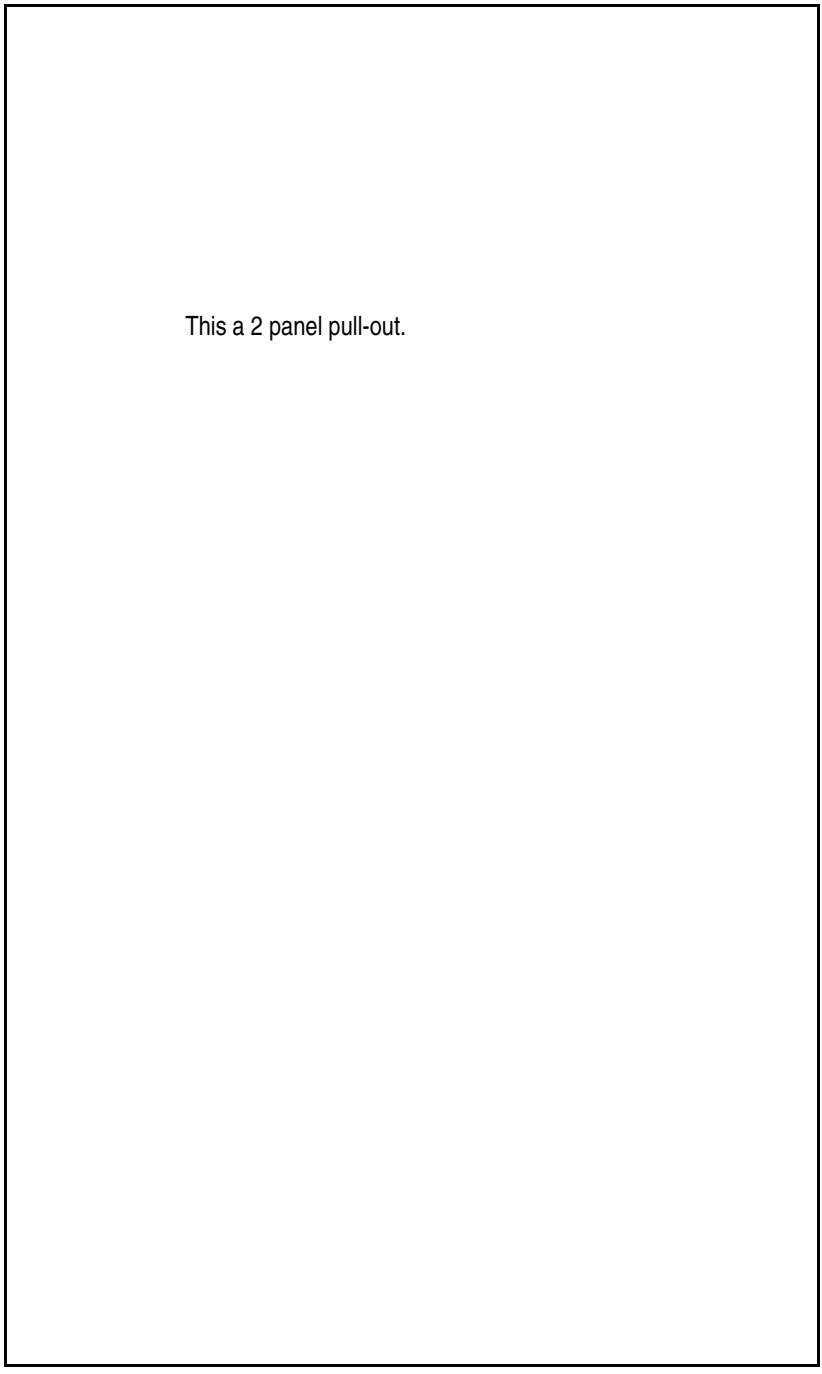



**Figure 5-22 MP (Tray 1) Timing Diagram—HP LaserJet 4 Plus/4M Plus/5/5M/5N**

## Warmup Period

The Warmup period begins when the printer's power is turned ON, and ends when the fusing roller temperature reaches 172° C. When the printer is switched ON, the exhaust fan (FM1) begins low-speed rotation and the fusing roller maintains 172° C. The DC controller then switches the main motor (M1) ON, and applies AC high voltage to the primary charging roller to remove any residual charge from the photosensitive drum. Negative high voltage is applied to the transfer roller to clean toner build-up from the roller. When the fusing roller reaches 172° C, the main motor, and AC high voltage, are turned OFF.

After the power is switched on, the Main Motor (M1) and the pickup motor (M2) turn for approximately 4 seconds to clear the paper path. The motors stop rotation when the fuser reaches 172° C.

After the printer warms up, the message `00 READY` is displayed, the printer goes "on-line," and the control panel keys become operational.

## Standby Period

When the Warmup period is completed, the message `00 READY` is displayed. At this point the printer is in the Standby period. This indicates that the printer is ready for printing. The fusing roller remains at a constant temperature of 172° C, and the exhaust fan continues operating at low-speed rotation.

## PowerSave

When the printer enters PowerSave mode, fuser current is shut down, allowing the fuser to cool to room temperature without posting a `50 SERVICE` error. The exhaust fan continues to operate at low speed.

## Initial Rotation Period

When the DC controller receives a PRINT signal ($\overline{\text{PRNT}}$) from the formatter, the DC controller allows the fusing roller to begin warming up to approximately 183° C, and starts the main motor (M1), the pickup motor (M2), and scanner motor (M5). Next, the laser diode turns ON and generates a sweep beam used to adjust the laser power (APCIN). After the DC controller receives a BEAM DETECT signal (BD) initiated by the sweep beam, the laser power stabilizes and the sweep beam turns OFF.

The DC controller then turns ON the main motor, switches the exhaust fan to high-speed rotation, applies AC high voltage and negative DC high voltage to the primary charging roller, and applies negative high voltage to the transfer roller to help remove excess toner.

The developing bias (a negative AC/DC voltage) is applied to the developing roller 1.16 seconds after the main motor is turned ON, then positive high voltage is applied to the transfer roller 2.0 seconds after the main motor is turned ON.

When the fusing roller temperature reaches 183°, the MP (Tray 1) pickup roller clutch solenoid (SL2) energizes and paper is fed from the tray. If paper feeds from the PC tray (Tray 2), roughly 10 seconds after Initial Rotation begins, the PC tray (Tray 2) pickup roller clutch solenoid (SL1) energizes.

If a failure occurs during this period, the following errors may be displayed:

| | |
|---|---|
| 50 SERVICE | This error occurs when the fusing roller fails to reach the correct temperature in the required time (see "50 SERVICE") in Chapter 7). |
| 51 ERROR | This error occurs when the $\overline{\text{BD}}$ signal is not received by the DC controller, (see "51 ERROR BEAM DETECT)" in Chapter 7). |
| 52 ERROR | This error occurs when the scanner motor fails (see "52 ERROR," Chapter 7). |

## Print Period

When the leading edge of the paper activates the input/registration sensor (PS1), the DC controller forces the laser diode ON until a BD signal is received. Next, the DC controller receives a VIDEO data stream (VDO) from the formatter. The DC controller translates the VDO data into a VIDEO OUT signal (VDOUT), which modulates the laser diode ON and OFF, creating intermittent bursts of laser light which reflect off the scanner mirror and onto the photosensitive drum to form a latent electrostatic image. VDO data is sent from the formatter for each scan line of print data on a page, and a BD signal must precede each VDOUT line data received by the DC controller.

When the paper exit sensor (PS3) is activated by the leading edge of the first page, the DC controller allows the Fusing Roller to warmup to 183° C. After the last VDO data is sent for the last line of print data on the first page, the formatter sends a PRNT signal for the second page.

About 1.87 seconds after the first VDO signal is sent from the formatter, the High Voltage PCA applies positive high voltage to the transfer roller.

When the DC controller identifies the last line of print data on the first page, the laser diode is forced ON and generates a sweep beam used to adjust the laser power. After the DC controller receives a BEAM DETECT signal (BD) initiated by the sweep beam, the laser power stabilizes and the sweep beam turns OFF. The DC controller then searches for a PRNT signal to begin the second page.

When the DC controller receives the next PRNT signal from the formatter, the DC controller anticipates receiving a BD signal and energizes the pickup roller clutch solenoid (PC tray-SL1, MP tray-SL2, or lower cassette SL3) about 1.0 second before it receives the BD signal, and the second page feeds from the paper tray. Until the DC controller receives the expected BD signal, a nominal positive voltage is applied to the transfer roller to prevent toner build-up while the transfer Roller is in direct contact with the drum.

The formatter then sends $\overline{\text{VDO}}$ data to the DC controller. The DC controller translates the $\overline{\text{VDO}}$ signal into a VIDEO OUT signal (VDOUT), which modulates the laser diode ON and OFF, creating intermittent bursts of laser light that are reflected off the scanner mirror and onto the photosensitive drum to form a latent electrostatic image. Upon receipt of a BD signal from the DC controller, $\overline{\text{VDO}}$ data is sent from the formatter for each scan line of print data on a page.

Before the next sheet of paper arrives, the voltage on the transfer roller switches from the nominal standby voltage to a positive high voltage, to prepare to transfer the toner image from the drum to the paper. The process repeats for each successive page as necessary.

If a failure occurs during this period, the following errors may be displayed:

| | |
|---|---|
| `41 ERROR` | This error occurs when a sheet of paper is fed too soon or when an unstable $\overline{\text{BD}}$ or TOP signal is received (see "`41.x ERROR`" message in Chapter 7). |
| `50 SERVICE` | This error occurs when the fusing roller fails to rise to the correct temperature in the required time (see "`50 SERVICE`") in Chapter 7). |
| `51 ERROR` | This error occurs when the $\overline{\text{BD}}$ signal is not received by the DC controller (see "`51 ERROR`" in Chapter 7). |
| `52 ERROR` | This error occurs when the scanner motor fails (see "`52 ERROR`" in Chapter 7). |

## Last Rotation Period

After printing is complete, the Last Rotation period begins, during which residual static charges are eliminated from the photosensitive drum to prepare for the next printed page.

About 1.7 seconds after the Last Rotation period begins, a nominal standby voltage is applied to the transfer roller to stop the toner attraction. Then, 4.0 seconds after the Last Rotation period begins, the negative DC high voltage on the primary charging roller is turned OFF, leaving the AC voltage to neutralize the drum's surface. Finally 5.98 seconds after beginning the Last Rotation period, the transfer roller voltage returns to a negative high voltage, and any toner on the surface of the transfer roller is attracted to the photosensitive drum.

At the end of the Last Rotation period, the fusing roller returns to 172° C, the main motor turns OFF, the scanner motor turns OFF, the AC high voltage to the primary charging roller turns OFF, the transfer roller voltage returns to 0 volts, and the printer returns to the Standby period. About 30 seconds after the printer returns to the Standby period, the exhaust fan switches to low-speed rotation.

When another $\overline{\text{PRNT}}$ signal is sent from the formatter, printer operation resumes.

# 6

# Removal and Replacement

This chapter describes the complete disassembly of the printer from the beginning. In every instance, tasks that must be performed before beginning the procedure are listed first. Remove the assemblies in the order listed to prevent damage during re-assembly.

Removal and replacement of user-replaceable maintenance items is shown in Chapter 4, “Preventive Maintenance.” These items include:

- All Pickup Rollers and Separation Pad
- Transfer Roller Replacement
- Installing the Toner Cartridge

Servicing the printer involves replacing printed circuit and electro-mechanical assemblies. Do not repair component failures within these assemblies. In all instances, replace the failed assembly.

*The assembly procedure is the reverse of the removal procedure, except where specific instructions are provided.*

**Caution**

Power-off the printer and disconnect the power cord from the power outlet and the printer before servicing the printer.

Some sheet metal edges, particularly around the formatter cage, are sharp. Be careful when working in these areas to avoid being cut.

**Note**

The printer contains parts that are sensitive to Electrostatic-Static Discharge (ESD). Always observe proper ESD procedures when servicing the printer. **This symbol: appears in this chapter when the parts being serviced are especially susceptible to ESD damage.**

# Required Tools

**Table 6-1** Required Tools

| QTY | TOOL |
|---|---|
| 1 | #2 Magnetized Phillips Screwdriver (6-inch shaft) |
| 1 | Small Needle Nose Pliers |
| 1 | Small Flat-head Screwdriver (6-inch shaft) |
| 1 | 5mm Nut driver |

# Hardware Review

All screws used in the printer are Phillips head, which require a Phillips screwdriver. Figure 6-1 shows the difference between a Phillips and a Pozidriv screwdriver. Note that the Phillips tip has more beveled surfaces.

**Caution** Use of a Pozidriv screwdriver will damage the screw heads. Use Phillips only.

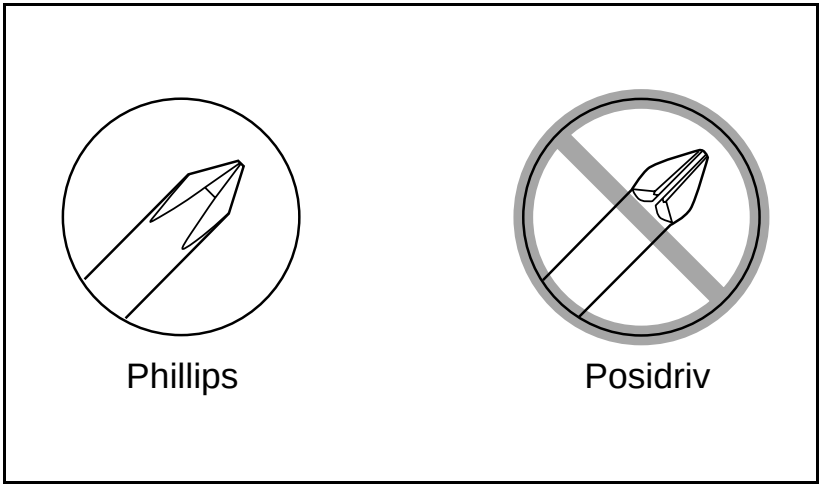
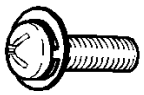
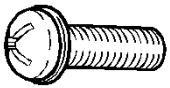
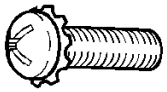
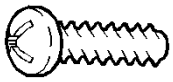
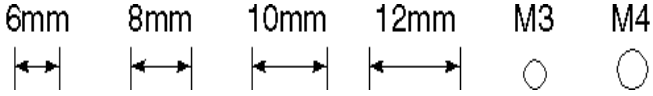



**Figure 6-1 Comparing Phillips and Pozidrive Screws**

Table 6-2 describes the screws used in the printers, and provides guidelines to help determine where each type of screw is used. The screws can vary in length depending on the thickness of the material being fastened.

Typically, plated screws are used in areas visible to the customer, and black screws are used in all other areas of the printer. Always note where each type of screw is located and replace each one into its original location.

**Table 6-2** Printer Hardware Descriptions

| DRAWING | DESCRIPTION | PURPOSE |
|---|---|---|
|  | Threaded Phillips screw with lock and flat washer | Used to fasten metal or plastic to threaded plastic or metal. |
|  | Threaded Phillips washer head screw | Used to fasten metal or plastic to metal when high torque is required. |
|  | Threaded Phillips w/captive star washer | Used to fasten metal to metal when good electrical contact is needed. |
|  | Self-tapping Phillips screw | Used to fasten metal or plastic to plastic mainframes. |
|   | | |

**Caution** To install a self-tapping screw, first turn it counter-clockwise to align it with the existing thread pattern, then carefully turn clockwise to tighten. *Do not over-tighten.* If a self-tapping screw-hole strips, repair of the screw-hole or *replacement of the affected assembly is required.*

In the removal and replacement procedures that follow, the number inside the parentheses, such as (4), refers to the number of screws you must remove.

# Removing the Covers

## Right Side Cover Removal

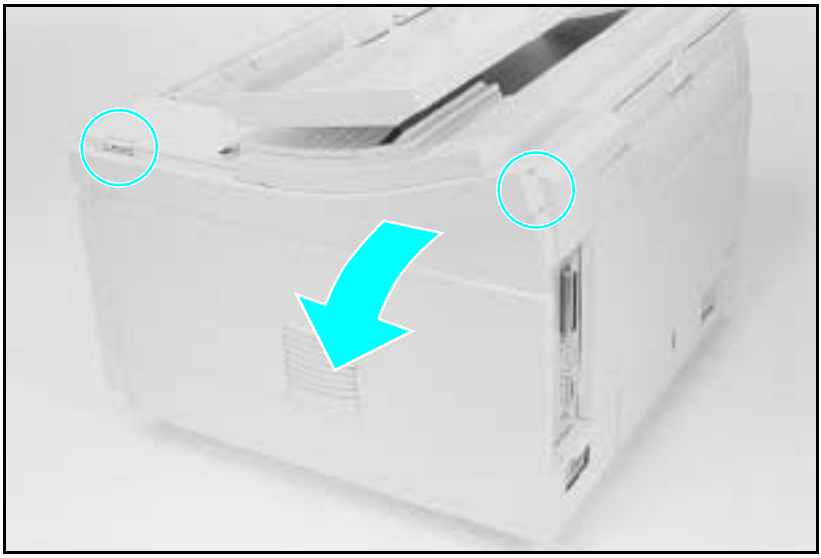


Figure 6-2 Right Side Cover Release Points

**LJ 4/4 Plus**

1 Open the Top Cover and release the Right Side Cover by pressing at the points shown in Figure 6-2.
2 Fold the cover away from the printer to release the bottom supports and lift the door off of the printer frame.

**LJ 5**

1 Open the Top Cover and loosen the retaining screw on the right side cover located at the upper right rear of the printer.
2 Slide the right side cover back and fold the cover away from the printer to release the bottom supports.

**WARNING!** Since the handle is part of the right side cover, the retaining screw must be fully tightened or printer damage or personal injury may result.

## Top Cover Removal

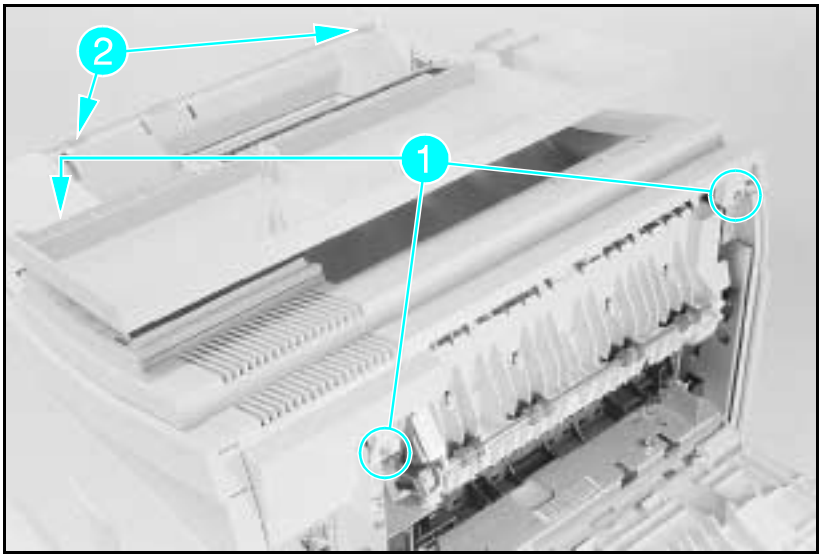



Figure 6-3 Front Top Cover Screws and Latches

**1** Open the Top Cover.
**2** Remove the Right Side Cover.
**3** Open the Rear Door.
**4** Remove the (3) screws shown in Figure 6-3, callout *1*.
**5** Release the (2) latch points with a flat screwdriver while lifting the Top Cover (see callout *2*.)
**6** Carefully lift the top cover to access the Control Panel cable.

*(continued on next page)*

Figure 6-4 Control Panel Cable

**7** Disconnect the Control Panel Ribbon Cable and remove the top cover (see Figure 6-4).

## Left Side Cover Removal

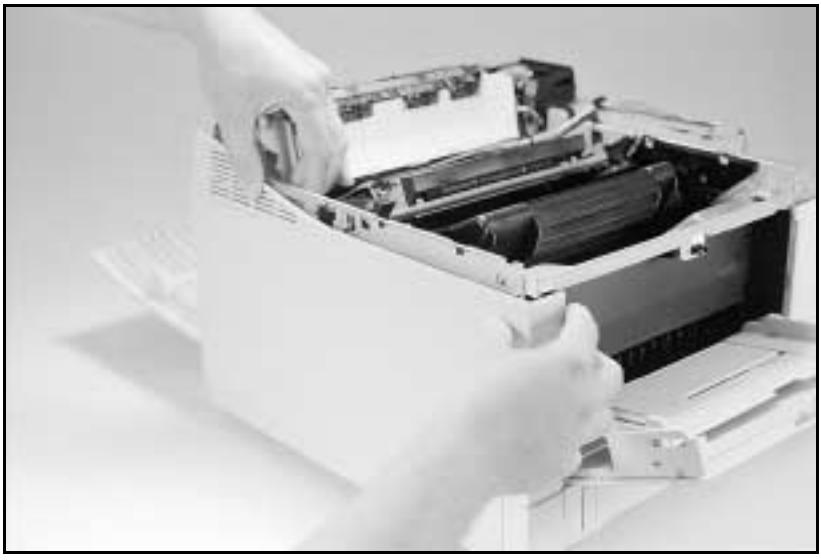


**Figure 6-5 Left Side Cover Latches**

1 Remove the Right Side Cover and the Top Cover.
2 Release the 2 latch points on the Left Side Cover (front latch first) see Figure 6-5. The latches are on the inside of the Left Side Cover.
3 Fold out the cover and remove.

**Note** When removing the LJ 5 left side cover, you must gently push the Tray 1 cover forward to enable the left side cover to be folded out and removed.

## Rear Door Removal

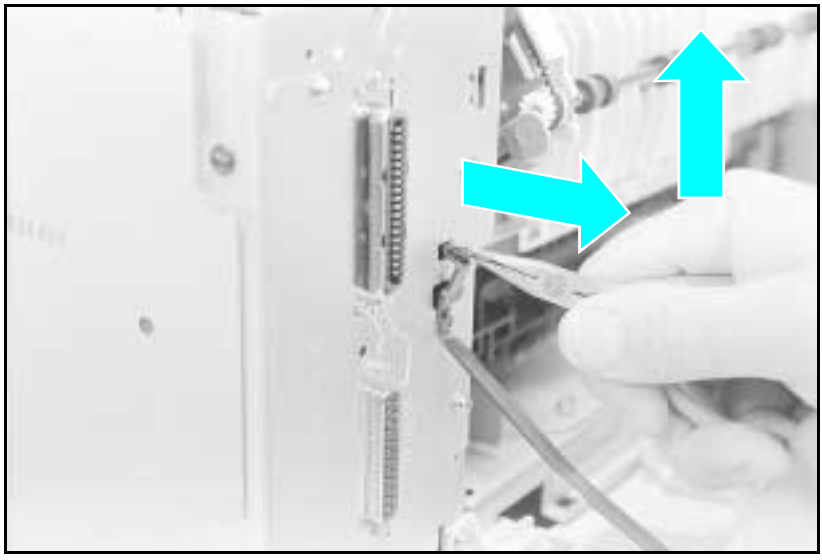


Figure 6-6 Releasing the Door Support

1 Remove the PC tray (Tray 2).
2 Open the Rear Door. Support the door with one hand.
3 Release the door support from the rear of the printer frame as follows: (see Figure 6-6)
   a Using needle-nose pliers, squeeze the tabs on the end of the retaining strap. Slide the strap up and out of the printer frame.
   b Release the retaining strap tab from the slot in the printer frame.
   c Lift the tab to free it from the slot.

*(continued on next page)*

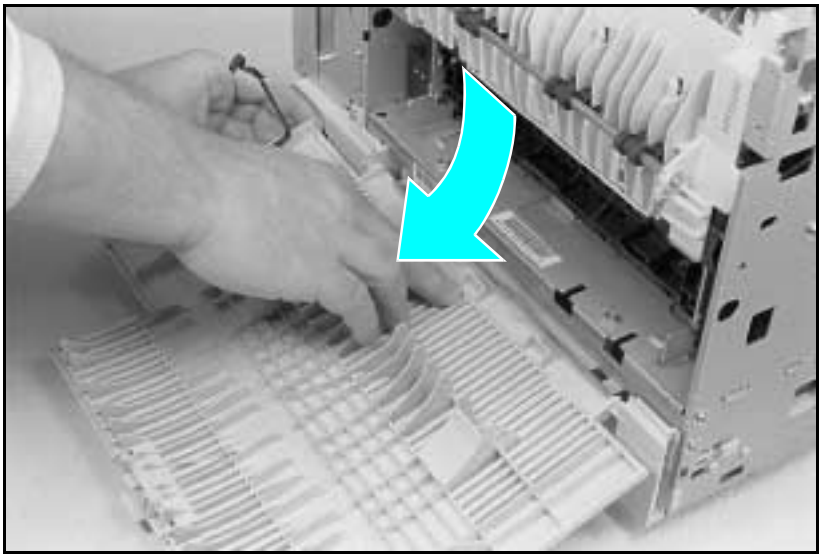


Figure 6-7a Releasing the Door Hinge (LaserJet 4/5)

4 **LaserJet 4/5:** Flex the Rear Door to release it from its hinges. Press the middle of the door while lifting either side (Figure 6-7a). **LaserJet 4 Plus:** Remove the Rear Door Attaching Clip (Figure 6-7b, callouts *1* through *3*). Slide the Rear Door as far as possible toward the left, then rotate to remove (Figure 6-7b, callouts *4* and *5*).

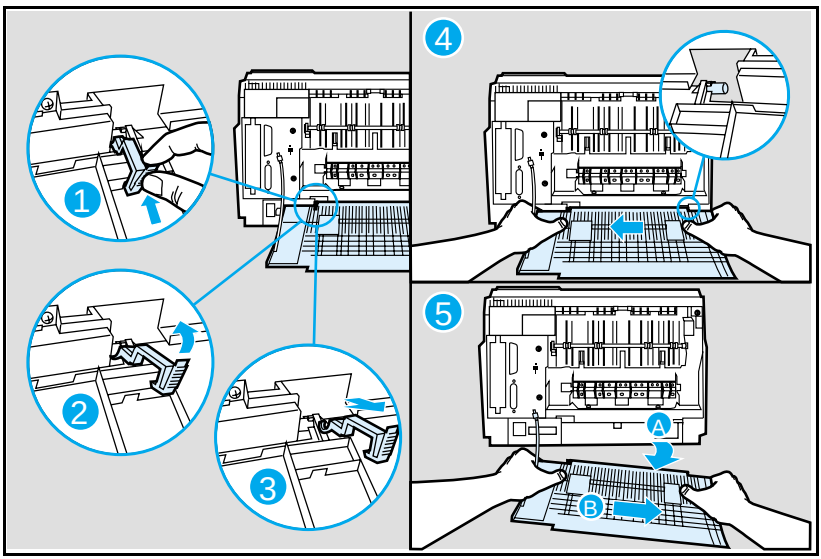



Figure 6-7b Releasing the Door Hinge (LaserJet 4 Plus)

## Font Door Cover Removal (LJ 5 Right Front Cover Removal)

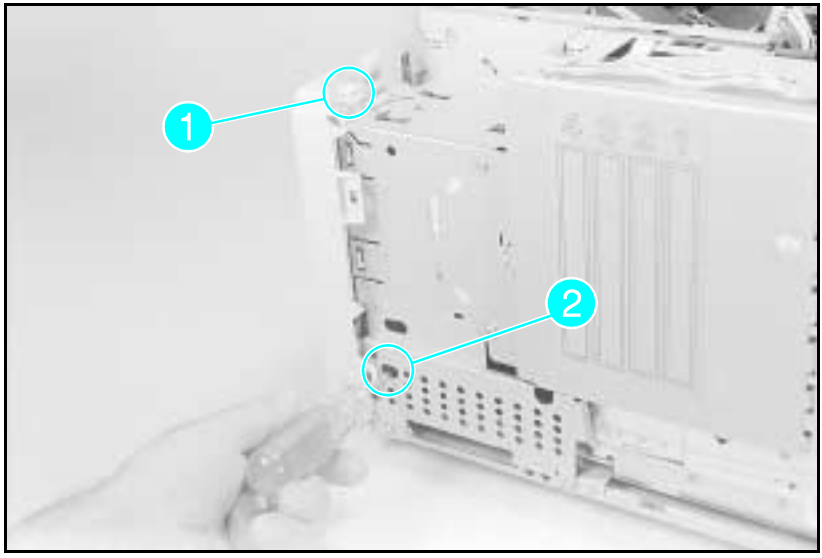



Figure 6-8 Font Door Removal (LaserJet 4 shown)

**LJ 4/4 Plus**

1 Remove the Right Side Cover, the Top Cover,and the PC Tray.
2 Release the top latch (see Figure 6-8, callout *1*).
3 Release the (2) lower latches through the access hole in the metal cover (see Figure 6-8, callout *2* and Figure 6-9, callout *1*).
4 Remove the Font Door Cover.

**Note** Figure 6-9 shows the metal side cover removed in order to show the Font Door latches. It is not necessary to remove the metal side cover to remove the Font Door.

**LJ 5**

1 Remove the right side cover, the top cover, Tray 1 door, and Tray 2.
2 Remove the Right Front Cover retaining screw.
3 Release the top latch. (See Figure 6-8, callout 1)
4 Release the latch halfway down the right side of the cover.
5 Release the (2) lower latches, one through the access hole in the metal cover (see Figure 6-8, callout 2), and one from the bottom of the printer (next to the Tray 2 guide).

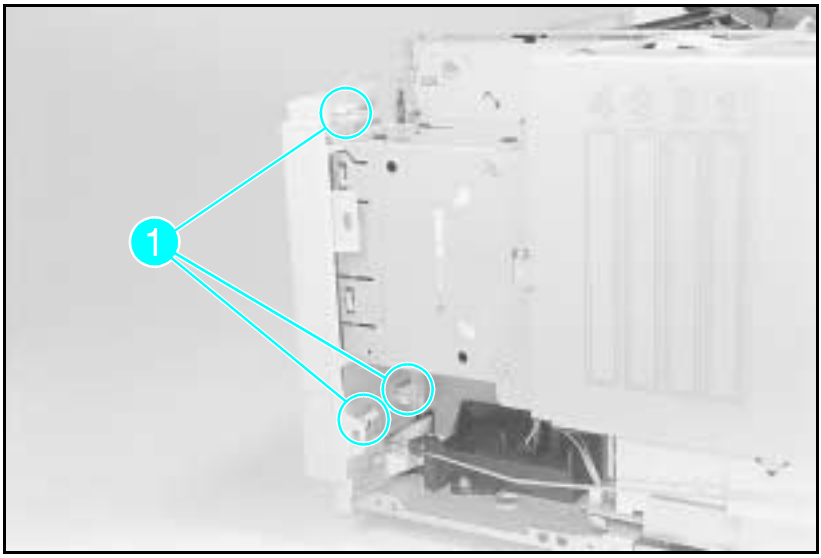



**Figure 6-9 Font Door Cover Latches**

## Multi-Purpose (MP) Tray (Tray 1) Door Removal

Figure 6-10 Removing the MP Tray Door

1 Remove the PC Tray.
2 Open the MP Tray door and extend the MP Tray.
3 Bend the Door Slides out to release the tray from the door slides (see Figure 6-10). Place the inner door in the “up” position.

**LJ 4/4 Plus**

4 Flex the MP tray at the lower middle and release the door from its hinges (seeFigure 6-10).

**LJ 5**

4 Slide Tray 2 to the right to release it from its hinges.

## Multi-Purpose (MP) Tray (Tray 1) Removal

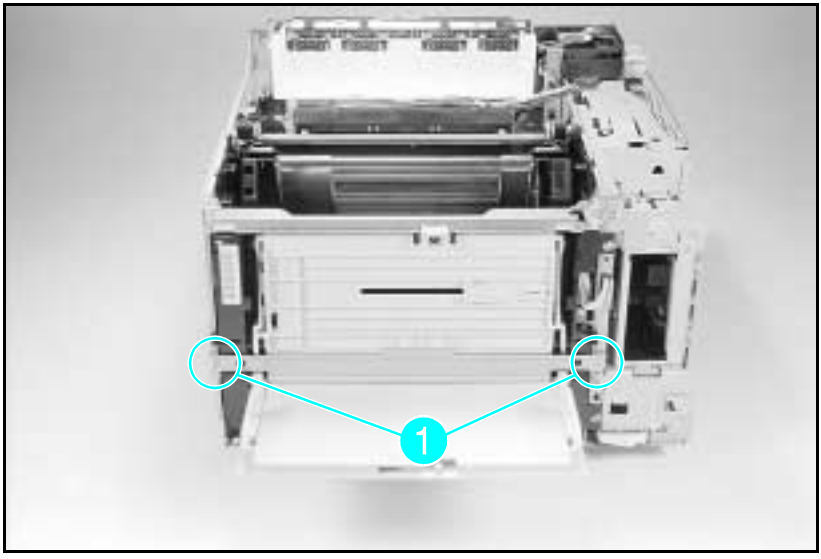



Figure 6-11 Remove the Crossmember Bracket

**1** Remove the Right Side Cover, Top Cover, Left Side Cover, MP Tray Door (Tray 1), and the Font Door Cover.
**2** Remove the PC Tray (Tray 2).
**3** Remove the (2) screws in the Cross-member Bracket as shown in Figure 6-11, callout *1*. Remove the Cross-member Bracket.

*(continued on next page)*

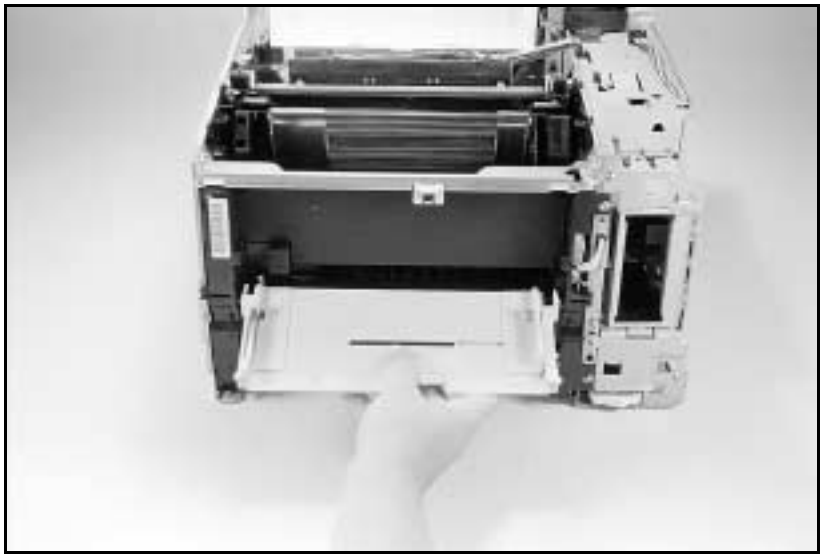


**Figure 6-12 Rotate the Tray Down to Release the Hinge from its Slots**

**4** On the LJ 4+ and LJ 5 you must release the tray tension spring located at the left side of the tray. Use a pair of needlenose pliers to remove the spring from the tray.

**5** Rotate the tray down until it slides off its slotted hinges (about 120°)(see Figure 6-12).

# Assemblies Removal

## Power Supply Removal

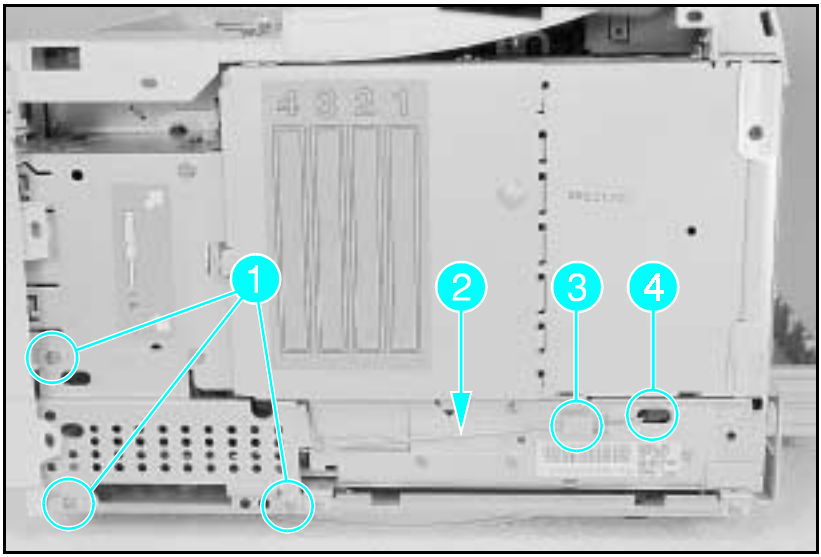



Figure 6-13a Remove the Sheet Metal Plate (LaserJet 4)

**1** Remove the Right Side Cover.

**2** Remove the (3) or (2) screws from the metal cover at the lower right corner of the printer (see Figure 6-13a or b, callout *1*.) Remove the metal cover.

**Note** Note which end of the connecting rod is installed into the Power Supply and which end connects into the Rocker Switch.

**3** Remove the Power Switch Connecting Rod (callout *2*.)

**a** lift the rod clear of tab (callout *3*), and remove from socket (callout *4*).

**b** Remove the rod from the Rocker Switch at the front of the printer.

*(continued on next page)*

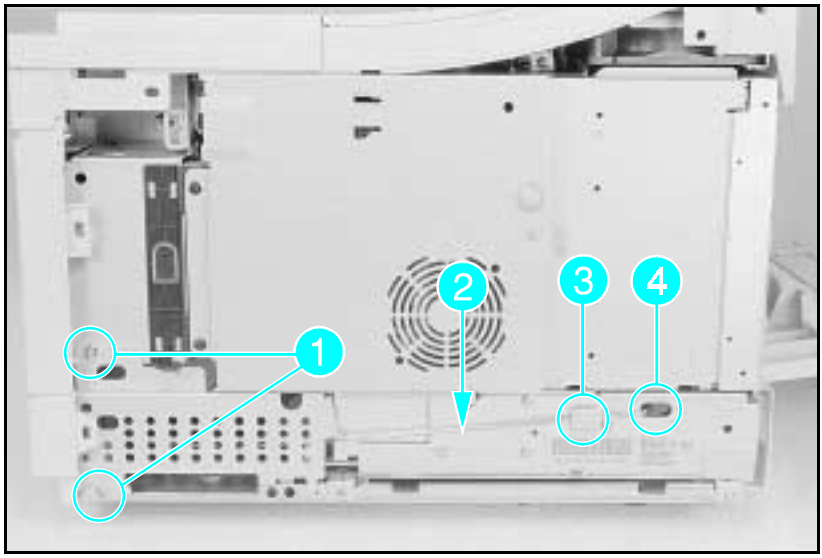



Figure 6-13b Remove the Sheet Metal Plate (LaserJet 4 Plus/5)

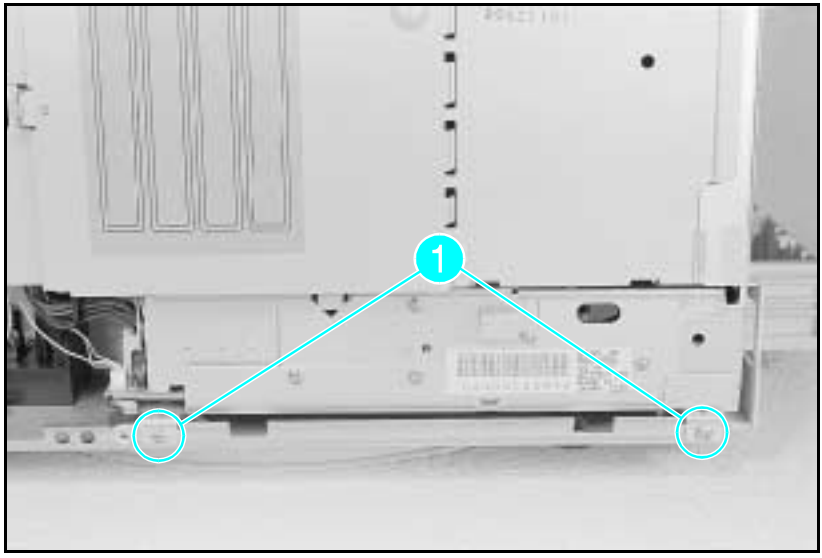



Figure 6-14 Power Supply Screws

**4** Remove the (2) screws from the bottom frame (see Figure 6-14, callout *1*).

**5** Slide the power supply out the right side of the printer to access the power supply connectors.

*(continued on next page)*

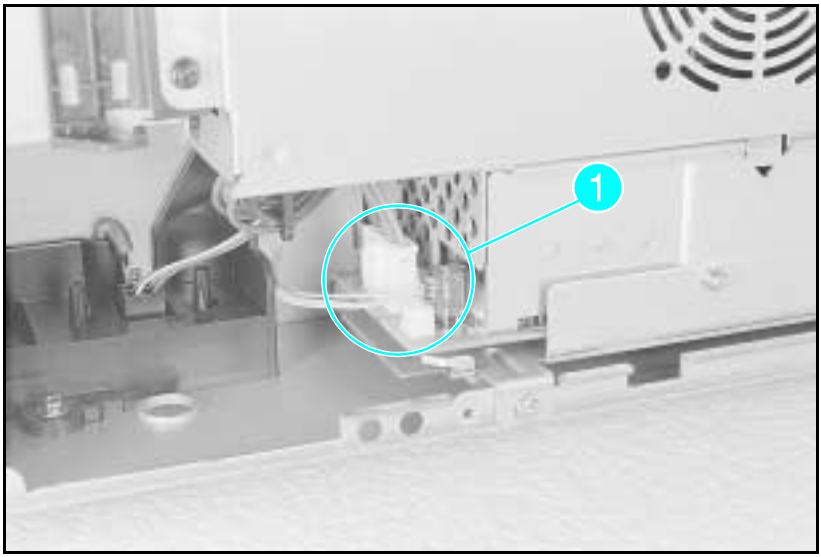



**Figure 6-15** **6-wire and 3-wire Connectors for the Power Supply**

**6** Remove the (2) connectors (6 wire and 3 wire). (See Figure 6-15, callout *1*.) Squeeze the release tab on the 6-wire connector. Pull the 3-wire connector straight up.

**7** Remove the power supply.

**Note** When replacing the power supply, be sure to use the screws with the star washers to ensure proper grounding and RFI shielding.

## Paper Feed Assembly Removal

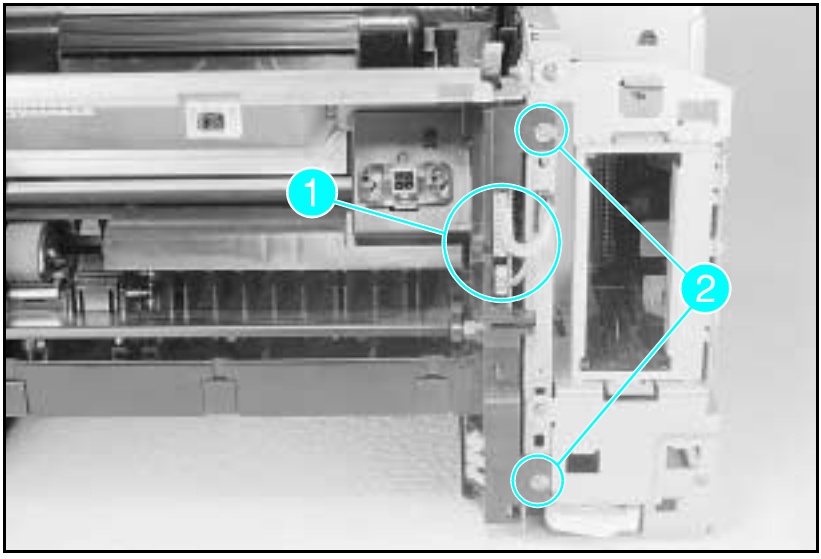



Figure 6-16 Paper Feed Assembly Screws and Connectors

**1** Remove the Right Side Cover, the MP opening cover, (see Figure 6-17), the Top Cover and the Left Side Cover, the Font Door Cover, and the PC tray (Tray 2). The MP tray need not be removed, but is shown removed for clarity.

**2** Remove the MP Tray (Tray 1) door, the Front Cross-member (Figure 6-11), and the MP Tray.

**3** Disconnect the 13-wire connector and the 4-wire connector from the front of the Paper Feed Assembly (see Figure 6-16, callout *1*).

**4** Remove the (2) screws from the right side of the Paper Feed Assembly (see Figure 6-16, callout *2*).

*(continued on next page)*

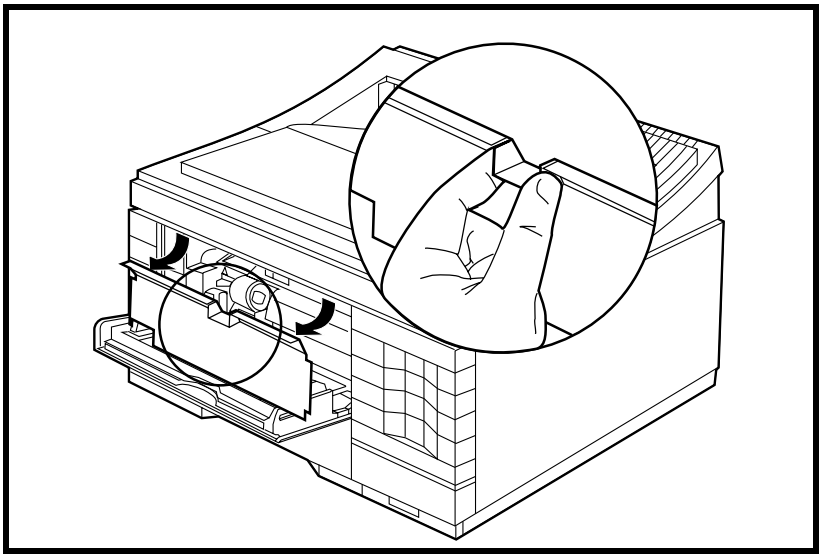


**Figure 6-17 MP Tray Opening Cover**

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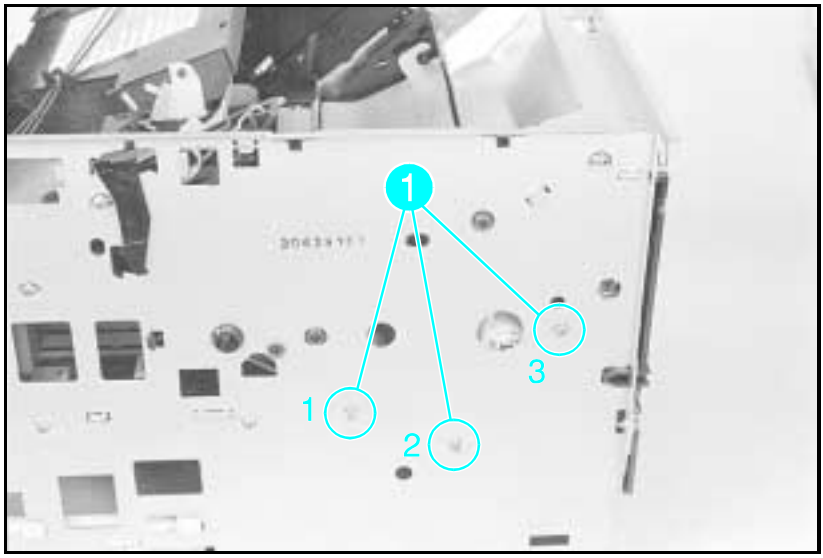


**Figure 6-18 Paper Feed Assembly Screws (numbered)**

**5** Remove the (3) screws from the left side of the printer (see Figure 6-18, callout *1*).

**6** Remove the Paper Feed Assembly by lifting it and sliding it out the front of the printer.

**Note** Replace the screws in order as shown. (1-2-3 is also scribed on the printer chassis.) Tightening these screws in the wrong order can cause paper skew problems.

## High Voltage Power Supply (HVPS) Removal

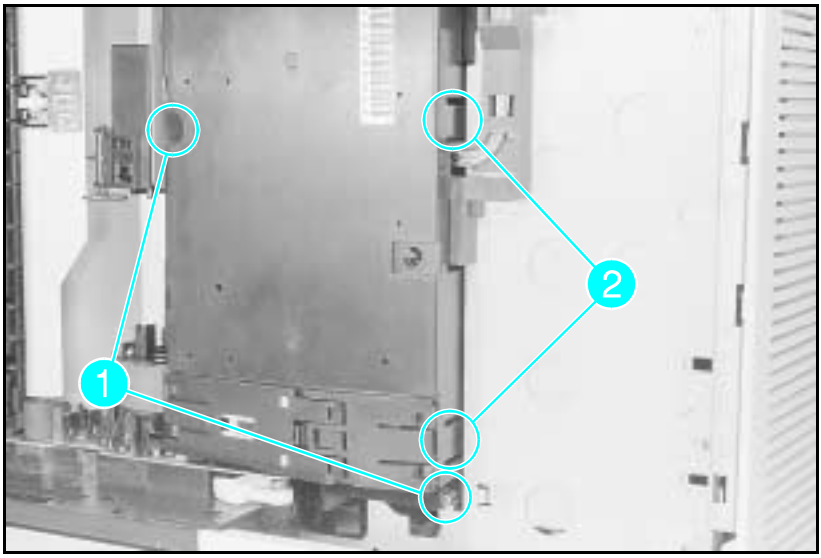


Figure 6-19 HVPS Screws (2) and Latches (2) (Bottom View)

1 Remove the Toner Cartridge and PC tray.
2 Lay the printer on its left side. (Place a cloth under the printer to prevent marking the cover.)
3 Remove the (2) screws that hold the HVPS in place (see Figure 6-19, callout *1*).
4 Release the (2) latches that hold the High Voltage Power Supply (see Figure 6-19, callout *2*).
5 Pull the HVPS straight away from the printer to clear its locator pins and to prevent damage to the HVPS connectors.
6 Remove the HVPS from its housing by releasing the (4) retaining clips that hold the PCA in place.

**Note** Run a printing self-test after replacing the high voltage power supply. If the printer prints solid black pages, the HVPS may be seated incorrectly. Repeat the installation procedure, being careful to align the high voltage connectors.

## Fuser Assembly Removal

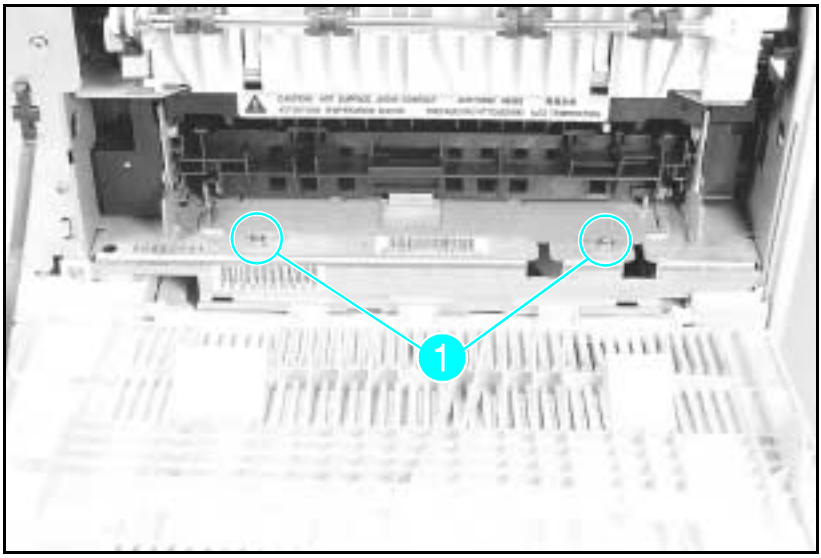


**Figure 6-20** **Fuser Assembly Screws**

**Caution** *The Fuser Assembly may be hot*. Allow plenty of time for the fuser to cool before beginning the fuser removal procedure.

**1** Open the rear door.
**2** Remove the (2) screws that hold the Fuser to the printer frame (see Figure 6-20, callout *1*).
**3** Slightly lift the Fuser by both the right and left sides to clear the locator points.
**4** Pull the Fuser from the printer.

**Note** The Fuser Assembly from the LaserJet 4 cannot be interchanged with the Fuser Assembly from the LaserJet 4 Plus or 5 printers.

## Control Panel and Overlay Removal

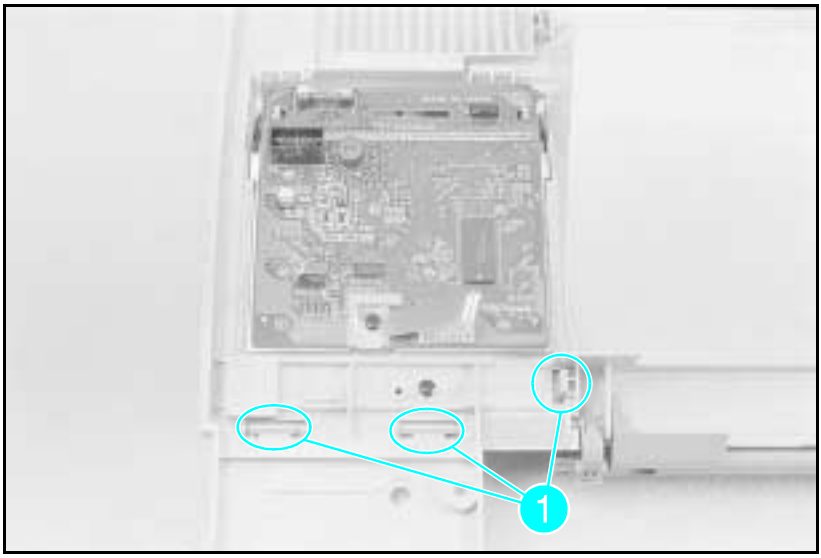


**Figure 6-21 Control Panel Latches**

1 Remove the Right Side Cover and the Top Cover.
2 Turn the Top Cover over and place it on flat surface.
3 Release the (3) latches that contain the Control Panel (see Figure 6-21, callout *1*).
4 Carefully pivot the Control Panel away from the Top Cover.

*(continued on next page)*

**Note**

To remove the LaserJet 5 Control Panel, first remove the black screw securing the grounding leaf spring and the Control Panel plate to the Top Cover. Release the two latches at the top of the Control Panel Assembly and pivot the top of the assembly up and out of the printer.

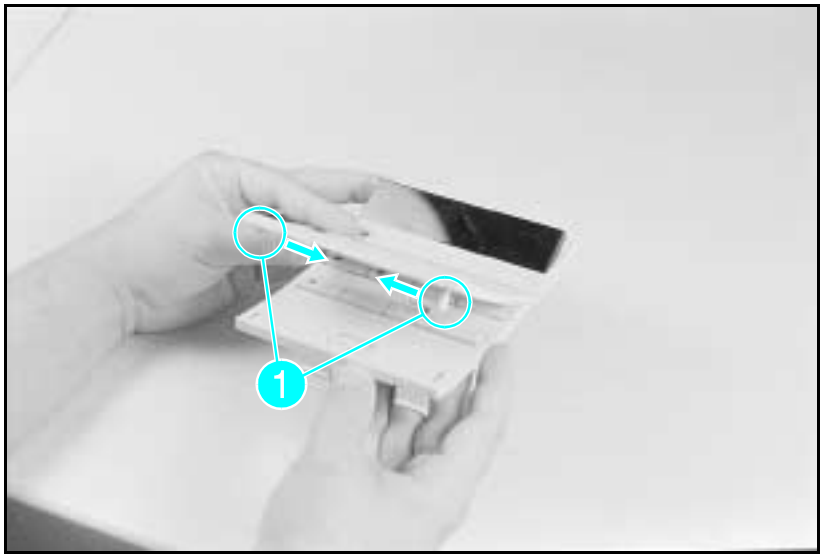


**Figure 6-22 Changing the Control Panel Overlay**

**5** If you must replace the Control Panel Overlay, release the (2) retaining tabs from the Control Panel and separate the overlay from the Control Panel (see Figure 6-22, callout 1).

**6** Squeeze the sides of the Control Panel Overlay to release the (2) tabs (see Figure 6-22, callout *1*).

**7** Tilt the Overlay up and out.

**Note** To remove the Control Panel Overlay on the LaserJet 5 printer, first remove the Control Panel Assembly and then slide the Overlay out of the side of the Top Cover. Reinstalling the Control Panel Assembly will secure the Overlay in place.

## Removing the SIMMs Door

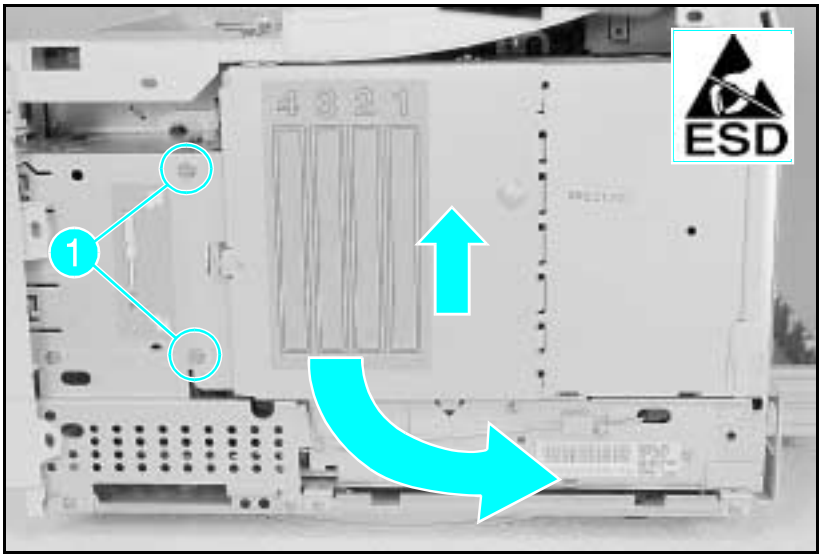


Figure 6-23a Removing the SIMMs Door (LaserJet 4)

**1** Remove the Right Side Cover.

**LaserJet 4:**

**2** Remove the (2) screws that hold the SIMMs cover (see Figure 6-23a, callout *1*).

**3** Open the SIMMs cover, lift the door slightly to remove the door from the hinge.

*(continued on next page)*

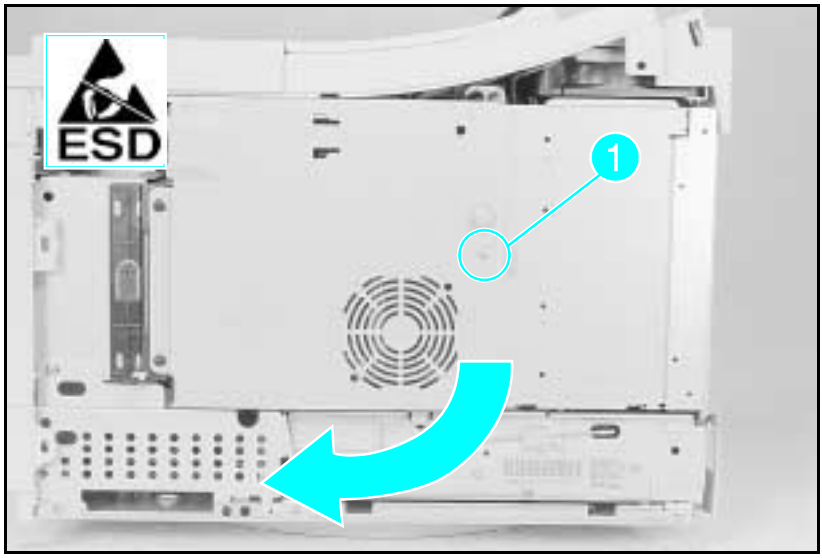


Figure 6-23b Opening the SIMMs Door (LaserJet 4 Plus)

**LaserJet 4 Plus/5:**
**2** Remove the (1) screw that holds the SIMMs cover (see Figure 6-23b, callout *1*).

**3** Swing open the SIMMs cover.

## Formatter Cage Removal

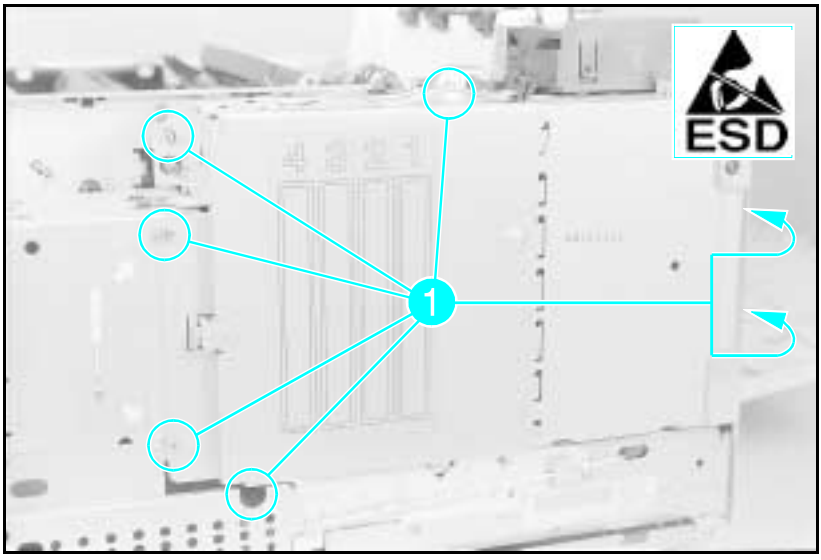


**Figure 6-24a** **Formatter Cage Screws (Right Side View - LaserJet 4 and 5)**

**Note** You may wisht to remove the metal cover (on the lower right side) and the power supply for easier access to the Formatter Cage screws.

1 Remove the Right Side Cover and the Top Cover.
2 **LaserJet 4 and 5:** Remove the (7) screws (6 screws in the LJ 5) shown in Figure 6-24a. (2) screws are on the right rear of the printer, (1) screw is under the lower front of the Formatter Cage (except LJ 5).
**LaserJet 4 Plus:** Remove the (3) screws shown in Figure 6-24b (one screw is located behind the SIMM door), and the (2) screws on the right rear of the printer (shown in Figure 6-24c).
3 Remove the Rear Door Support Strap.
4 Slide the Formatter Cage straight out the right side of the printer, being careful not to damage the Formatter/DC Controller pin connectors.

*(continued on next page)*

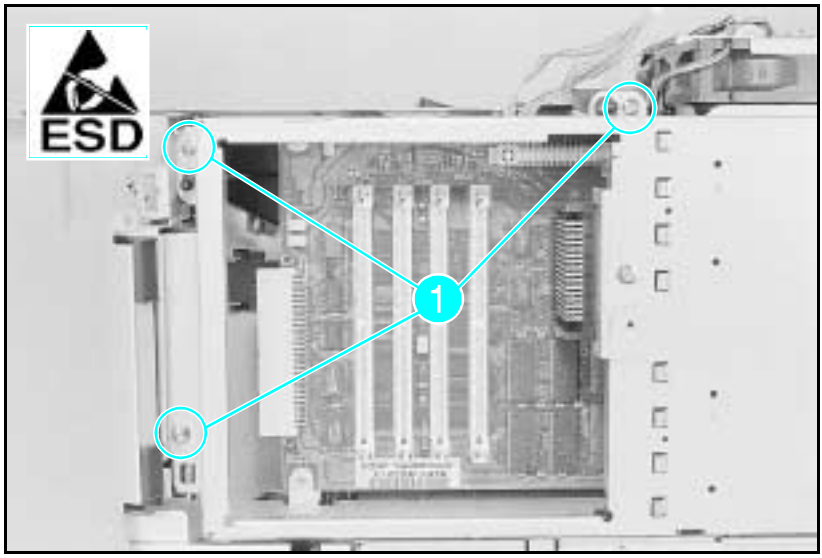


Figure 6-24b Formatter Cage Screws (Right Side View - LaserJet 4 Plus)

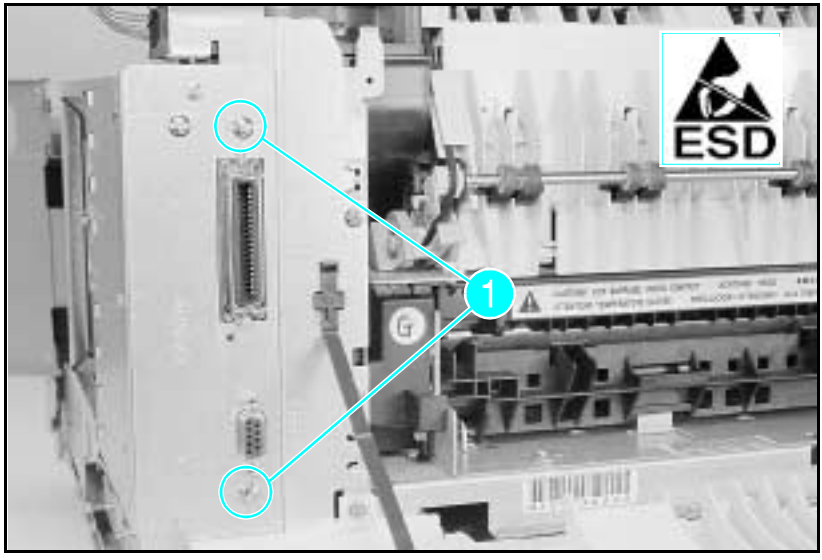


Figure 6-24c Formatter Cage Screws (Rear View - LaserJet 4 Plus)

## Formatter PCA Removal

**Caution** The Formatter PCA is very sensitive to Electrostatic Discharge (ESD) damage. Observe proper ESD procedures when servicing the printer.

**Note** Before removing the old Formatter PCA, print a `05 SELF TEST` to check the current printer page count, if possible. If a self test is not possible, enter the Service Mode, if possible, to display the page count (see "Service Mode" in Chapter 3).

Remove the Formatter Cage from the printer before beginning the Formatter PCA removal procedure. After the Formatter Cage is removed, remove the Formatter PCA as detailed on the following pages.

*(continued on next page)*

**LaserJet 4 Formatter PCA:**

1 Remove any MIO or SIMM modules from the Formatter Assembly.
2 Remove the (2) black screws from the side of the Formatter Cage (see Figure 6-25a, callout *1*).
3 Remove the MIO Connector Support Bracket (see Figure 6-25a, callout *2*).
4 Remove the (2) Formatter PCA mounting screws (see Figure 6-25a callout *3*).

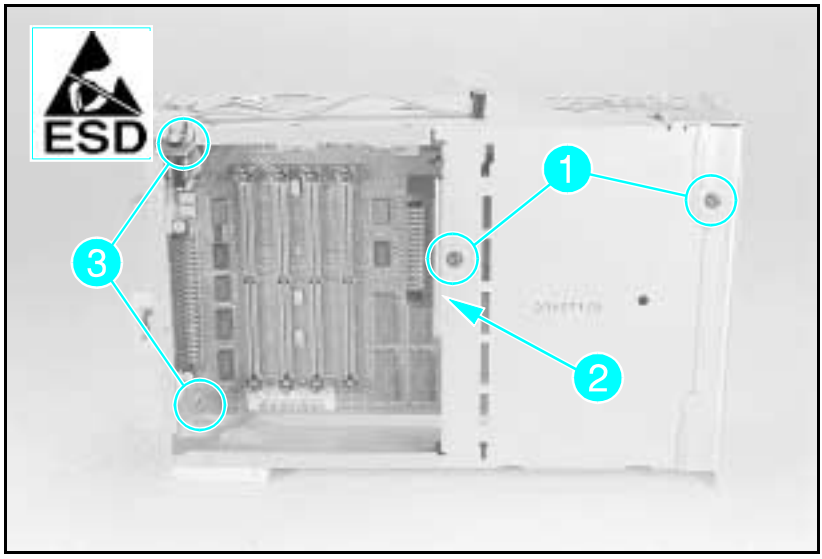


Figure 6-25a Formatter Cover and PCA Mounting Screws (LaserJet 4)

*(continued on next page)*

5 Remove the (4) Interface Connector Support Screws from the rear of the Formatter Cover. The RS-232 connector is held with 5mm hex-head cap screws (see Figure 6-25b, callout *1*). The parallel connector (see Figure 6-25b, callout *2*.) is held in place with Phillips screws.

6 Remove the Formatter PCA.

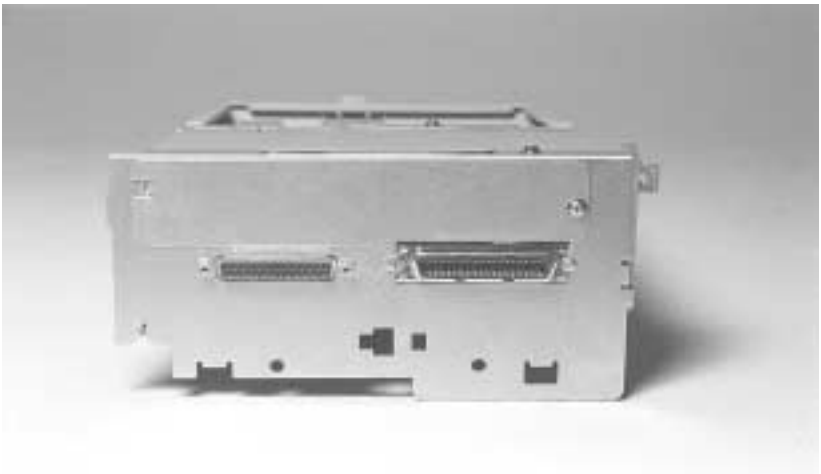

**Figure 6-25b Interface Connector Support Screws (LaserJet 4)**

**Note** When replacing the Formatter Assembly be sure to reinstall all SIMM modules and MIO cards. Be sure to reset the page count and the Cold Reset paper size after replacing the Formatter.

*(continued on next page)*

**LaserJet 4 Plus and 5 Formatter PCA**

1 Remove any MIO or SIMM modules from the Formatter Assembly.
2 Remove the MIO Connector Support Bracket (see Figure 6-25a, callout *2*).
3 Remove the (4) I/O screws (see Figure 6-26 callout *1*).
4 Remove the (2) Formatter PCA mounting screws (see Figure 6-26 callout *2*).

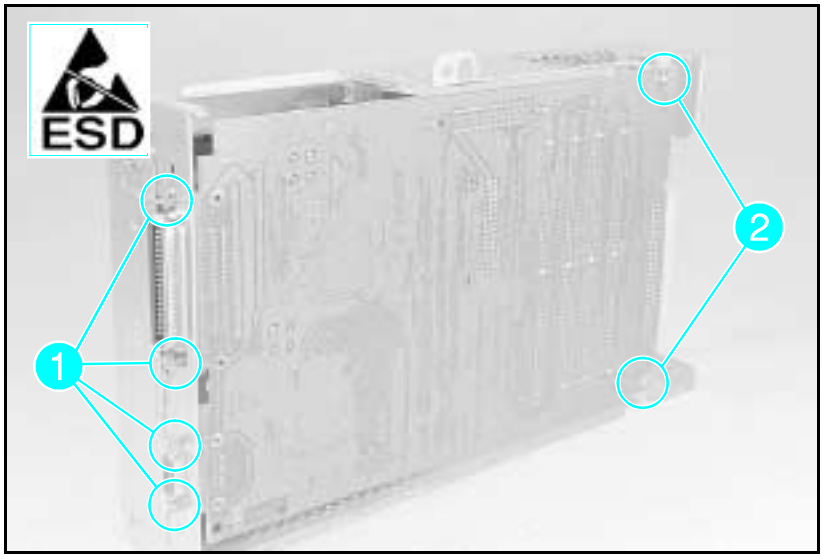


**Figure 1-26** **Interface Connector Support Screws (LaserJet 4 Plus and 5)**

**Note**

When replacing the Formatter Assembly be sure to re-install all SIMM modules and MIO cards.

Be sure to reset the page count and the Cold Reset paper size after replacing the Formatter.

## DC Controller Removal

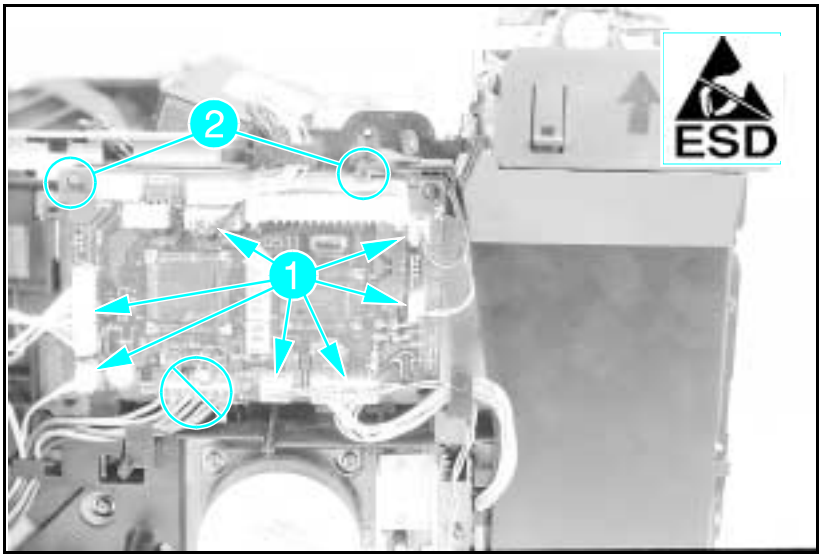


**Figure 1-27a** DC Controller Connectors/Retaining Clips (LaserJet 4)

**Note** Note the cable routing before beginning this disassembly procedure. Be careful not to damage the cables during re-assembly.

**1** Remove the Right Side and the Top Cover Assemblies.
**2** Remove the Formatter Cage Assembly.
**3** Remove the 6-wire connector from the Power Supply.
**4** Remove the plastic DC Controller cover (LaserJet 4 Plus).
**5** Remove the DC Controller connectors (see Figure 6-27a or 6-27b, callout *1*).
**6** Release the DC Controller from its retaining clips (2) and remove the DC Controller (see Figure 6-27a or 6-27b, callout *2).*

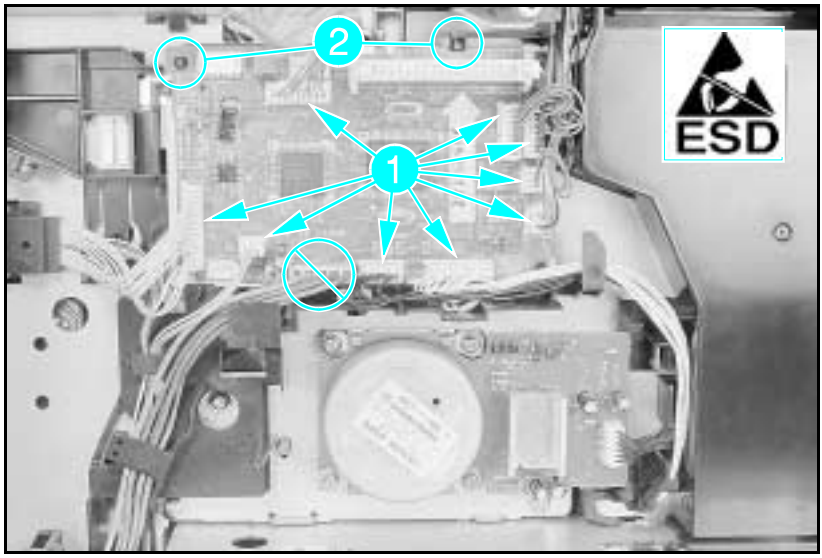


**Figure 1-27b DC Controller Connectors/Retaining Clips (LaserJet 4 Plus/5)**

### DC Controller Installation

**Caution** When reinstalling the DC Controller PCA it is extremely important that **all cables be properly routed.** If cables are not routed properly, it is difficult to reinstall the Formatter Cage and cable damage may result.

When replacing the DC Controller, be sure to set the leading edge adjustment as shown in the following procedure.

**Note** The Leading Edge Adjustment is set at the factory and is *not* required as a maintenance procedure. The Leading Edge Adjustment should be done only when the DC Controller is replaced.

*The following procedure is performed with the Formatter Assembly removed.*

To set the Leading Edge Registration:

1. Install the new DC Controller in the reverse order of the removal.
2. Run a test print to check the leading edge adjustment (as shown in Figure 6-28.
3. Use VR202 (LaserJet 4) or VR201 (LaserJet 4 Plus and 5) (see Figure 6-29) to adjust the leading edge registration to the dimension shown in Figure 6-28 (a=2mm).
4. Make several test prints (`15 ENGINE TEST` as shown in Figures 3-5 and 3-6) and check the adjustment. Repeat the above steps until the adjustment is correct.

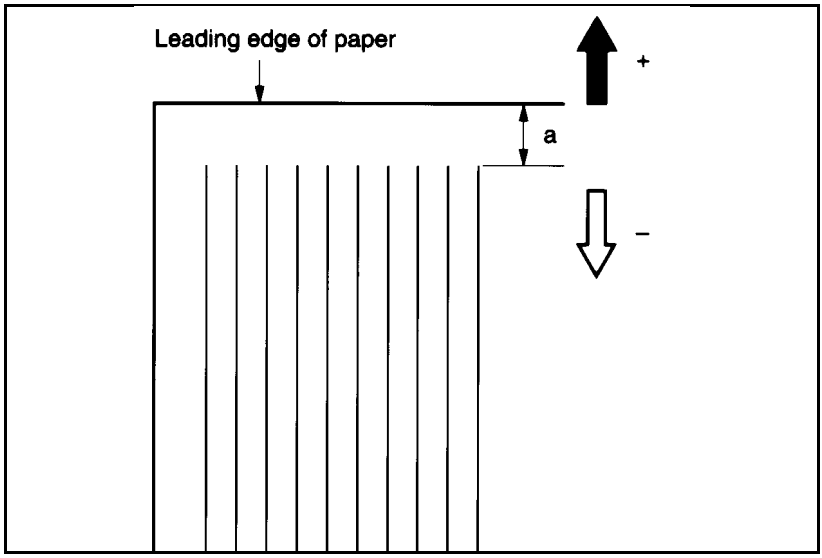


Figure 1-28 Leading Edge Registration Adjustment Dimensions

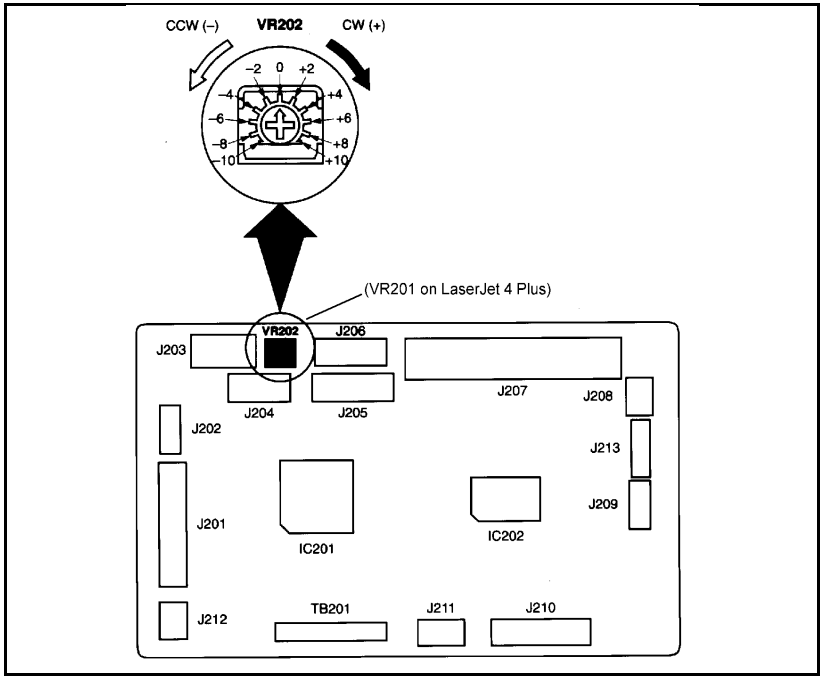


Figure 1-29 VR202 Settings (LaserJet 4 shown)

## Main Motor Assembly Removal

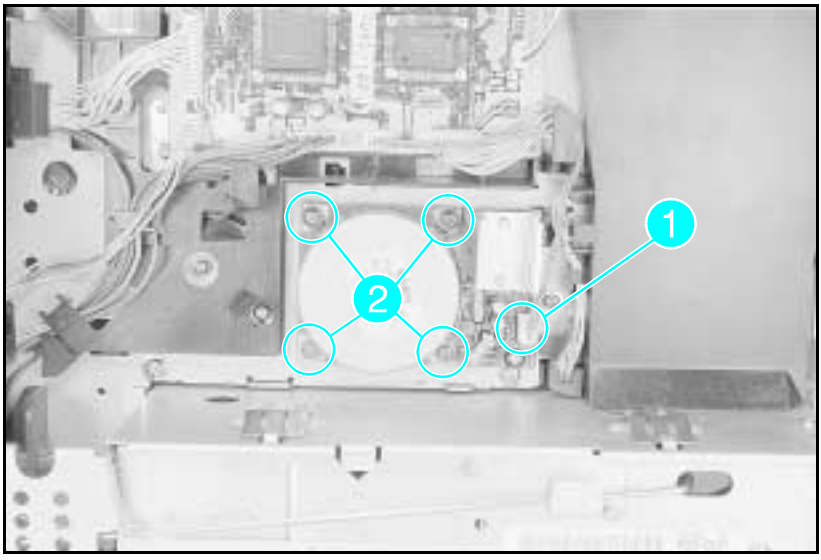


Figure 1-30 Main Motor Assembly

**1** Remove the Right Side Cover, Top Cover, and the Formatter Cage Assembly.

**2** Unplug the Main Motor connector from the Main Motor Assembly (see Figure 6-30, callout *1*).

**3** Remove the (4) Main Motor screws (see Figure 6-30, callout *2*).

**4** Remove the Main Motor.

## Gear Assembly Removal

1 Remove the Top Cover, the Right Side Cover, the Fuser Assembly, and the Formatter Assembly.
2 Remove the Main Motor Assembly (see Figure 6-30).
3 Remove the (2) screws that hold the Gear Assembly (see Figure 6-31 callout *1*).
4 Slide the Gear Assembly from the rear of the printer.

**Note** Before tightening down the mounting screws, be sure the shoulder around the upper left mounting screw hole on the gear assembly protrudes through the frame.

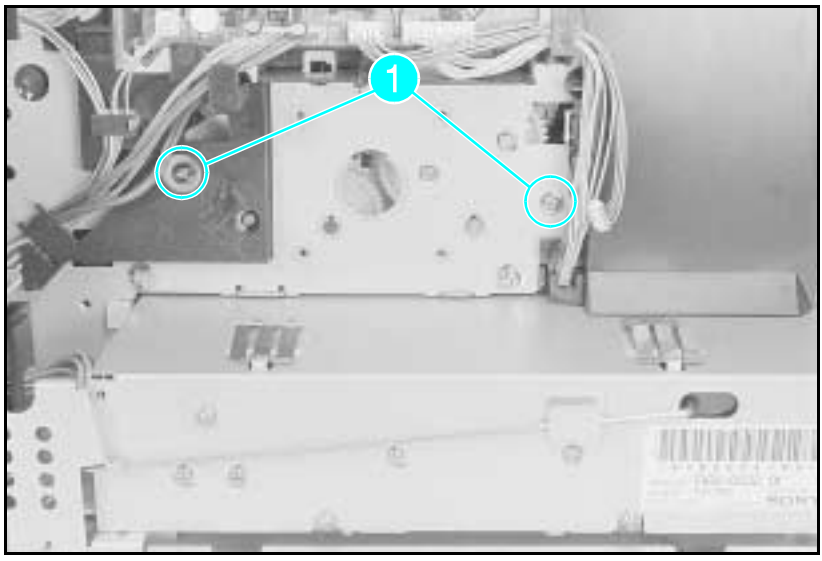


**Figure 1-31 Gear Assembly Screws (Located behind Main Motor)**

## Fan Removal

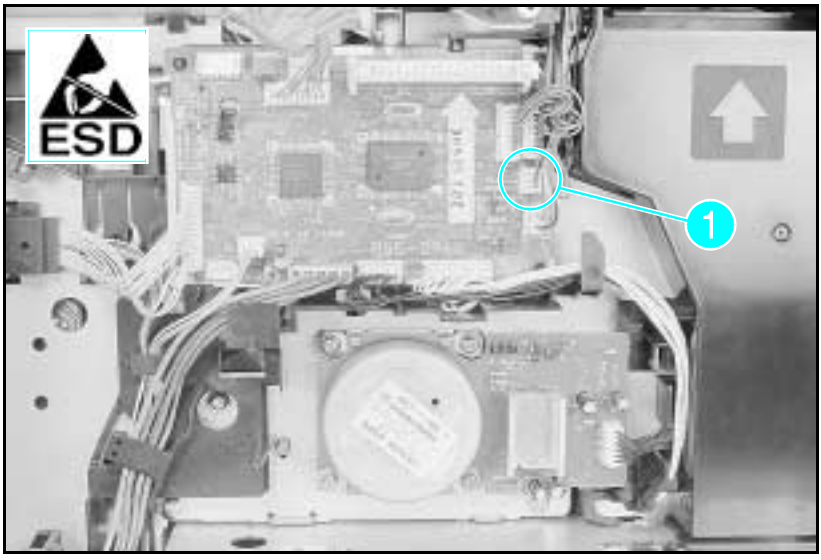


Figure 1-32 Fan Connector

**Note** Note the cable routing before beginning this disassembly procedure. Be careful not to damage the cables during re-assembly.

1 Remove the Right Side Cover, the Top Cover, and the Formatter Cage Assembly.
2 Unplug the fan connector (J209 on the LaserJet 4, J211 on the LaserJet 4+/5). (See Figure 6-32, callout *1*.)

*(continued on next page)*

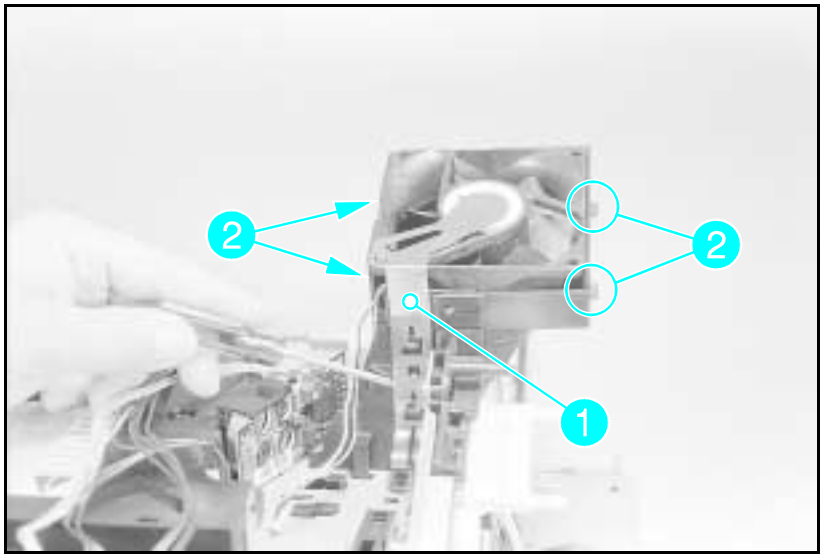


Figure 1-33 Exhaust Fan Removal (Laser Jet 4 shown)

3 Remove the RFI shield (LJ 4 only) by releasing the retaining tab and sliding the shield up (see Figure 6-33, callout 1).

4 **Laser Jet 4:** Release the (4) clips from the fan ducting to provide clearance and remove the fan from the top of the printer (see Figure 6-33, callout *2*).
**Laser Jet 4 Plus/5:** Remove (1) screw on the right-rear and release the tabs on the lower left adjacent to the Output Paper Assembly

5 Remove the fan.

**Note** When reinstalling the fan, verify that the air is blowing upward.

## Output Assembly Removal

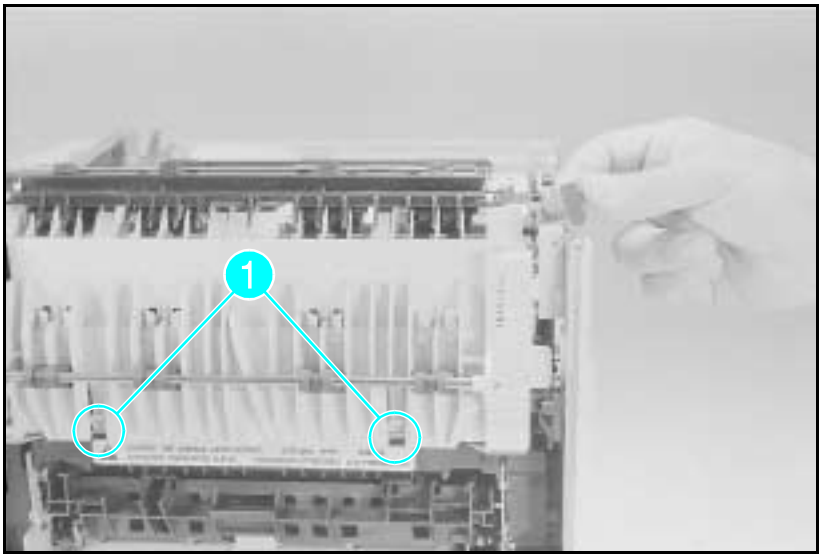


Figure 1-34 Output Assembly Removal

**1** Remove the Right Side Cover, the Top Cover, and the Left Side Cover.

**2** Release the grounding strap from the left side of the frame.

**3** Rotate the top of the Output Assembly toward the front of the printer while releasing the two retaining latches (see Figure 6-34, callout 1) until the locating tabs are free. Slide the assembly to the rear and lift it out of the printer.

## Paper Exit Sensor (PS3) Removal

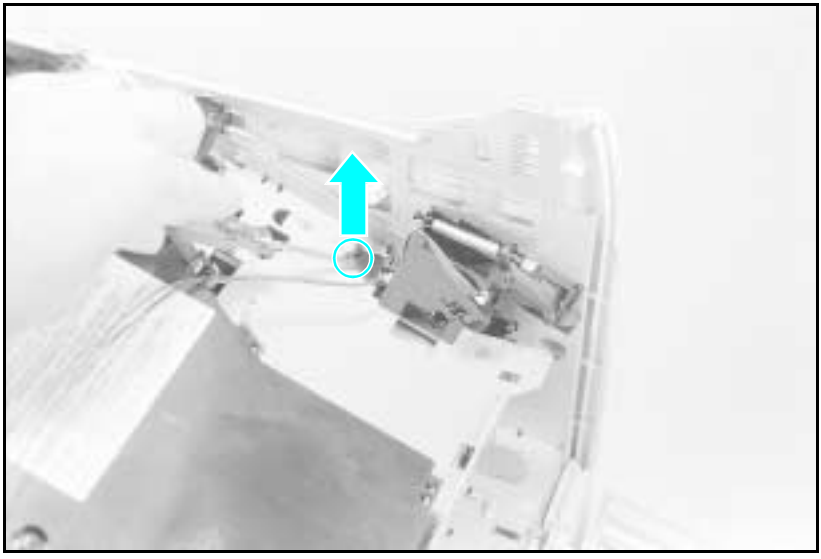

Figure 1-35 Exit Sensor

1 Remove the Right Cover, Top Cover, and the Output Assembly.
2 Disconnect the Sensor Cable.
3 Lift the Sensor Retaining Latch and slide the sensor forward (see Figure 6-35).
4 Remove the Paper Exit Sensor.

## Scanner Assembly Removal

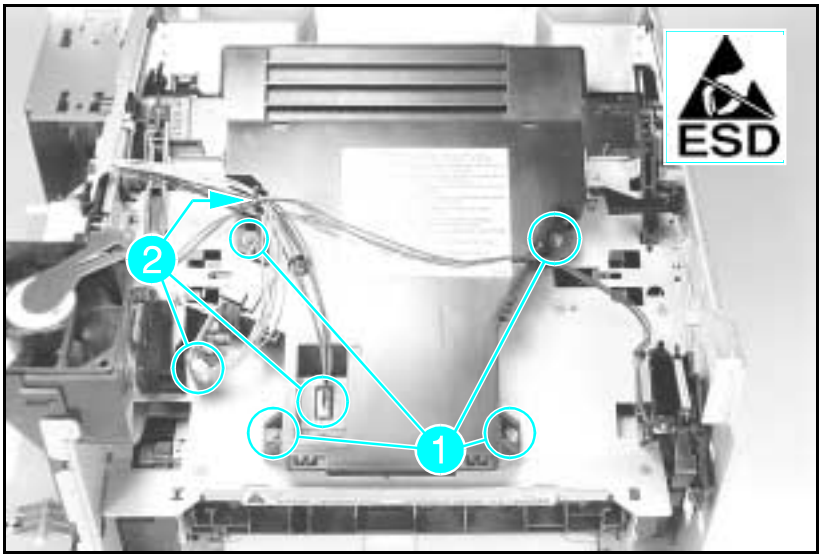


Figure 1-36 Scanner Assembly Removal

**1** Remove the Right Side Cover, Top Cover, Left Side Cover, and the Output Assembly.
**2** Remove all cables from the Scanner retaining clips.
**3** Remove the (3) connectors (see Figure 6-36, callout *2*).

**Note** Be careful not to flex the Laser PCA when removing or installing the cables. The Laser PCA can be damaged easily.

**4** Remove the (4) screws from the Scanner Assembly. (see Figure 6-36, callout *1*).
**5** Remove the Scanner Assembly.

**Note** When installing the Laser/Scanner Assembly, check that the Laser Shutter closes when the Toner Cartridge is removed.

# Lower Cassette Assemblies

The field-replaceable assemblies of the Lower Cassette are:

- Lower Cassette Sensor PCA Assembly
- Lower Cassette Pickup Motor Assembly

## Lower Cassette Sensor PCA Removal

**1** Release the Sensor PCA cover latches (see Figure 6-37 callout *1*).
**2** Cut the tie-wrap and remove the (3) sensor connectors (see Figure 6-37 callout *2*).
**3** Release the catch at the bottom rear of the Sensor PCA. (Use a slender object like a flat-blade screwdriver.)
**4** Remove the Sensor PCA.

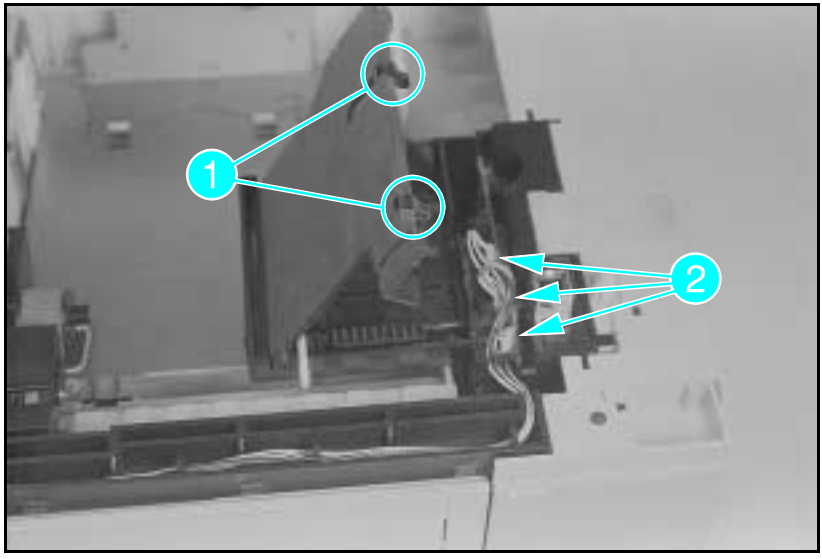


**Figure 1-37 Lower Cassette Sensor PCA Latches and Connectors**

## Lower Cassette Pickup Motor Removal

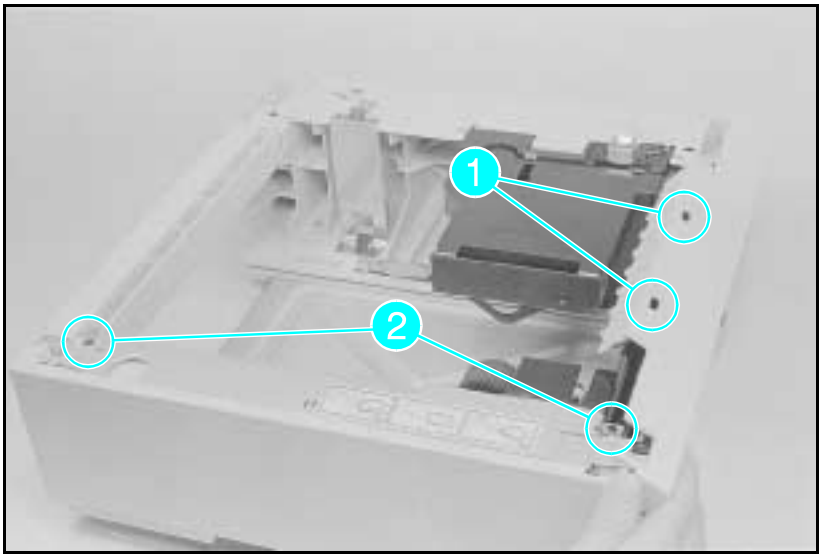


**Figure 1-38 Lower Cassette Upper Front Cover**

1 Open the sensor cover and disconnect the center and rear connectors (see Figure 6-37, callout *2*).
2 Release the (2) tabs that hold the Upper Front Cover (access the tabs through the slots with a small screwdriver - see Figure 6-38 callout *1*). Remove the cover by rotating it toward the front.
3 Remove the (2) screws from the front and rear left side (see Figure 6-38 callout *2*).
4 Remove the cables from the race channel at the front of the Lower Cassette Base (see Figure 6-37).

**Note** Note how the cables are routed in the the cable race. Be careful not to damage the cables during reassembly.

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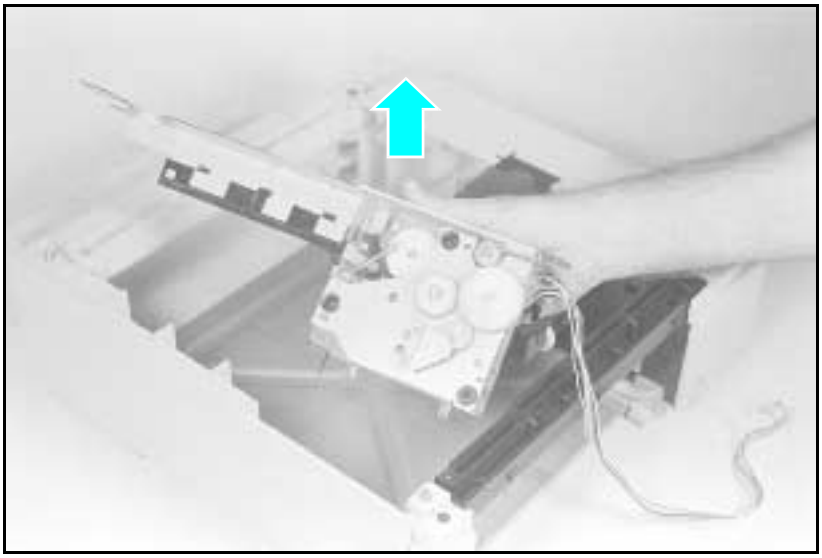

Figure 1-39 Lower Cassette Motor

**5** Lift the motor assembly straight up out of the the Lower Cassette Base (see Figure 6-39).

**Note** Note the ground connector underneath the Motor Assembly. Be careful not to damage this connector during reassembly.

## Replacing Fuser Assembly Parts

The following procedures describe the removal and replacement of major Fuser Assembly Components (Fusing Roller, Thermistor, Thermoswitch, and Heater Lamp). When performing these procedures, note the order in which the parts were removed and their orientation.

**Caution** Handle the Heater Bulb by the ceramic ends. Do not touch the Heater Bulb, or allow it to become contaminated. If contamination occurs, clean the bulb thoroughly with isopropyl alcohol.

### Fuser Assembly Configuration

Figure 6-40 provides an overview of the orientation of the major Fuser Assembly components. Before beginning the fuser disassembly procedures, become familiar with the location and orientation of the various Fuser Assembly parts (see Table 6-1).

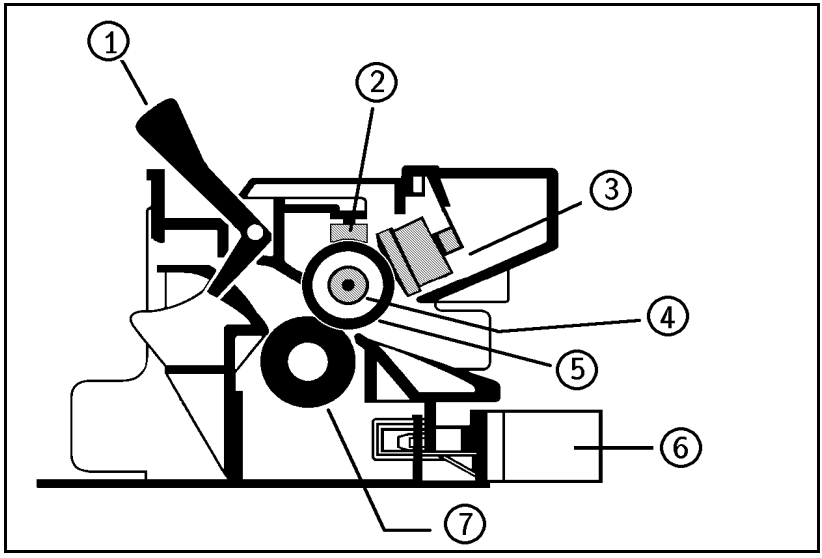


**Figure 1-40 Fuser Assembly**

**Table 1-1** Fuser Assembly Configuration

| Callout | Assembly | Callout | Assembly |
|---|---|---|---|
| 1 | Exit Sensor Flag | 5 | Fusing Roller |
| 2 | Thermistor | 6 | Plug to Interconnect PCA |
| 3 | Thermoswitch | 7 | Pressure Roller |
| 4 | Heat Lamp | | |

## Removing the Fuser Roller Heat Lamp

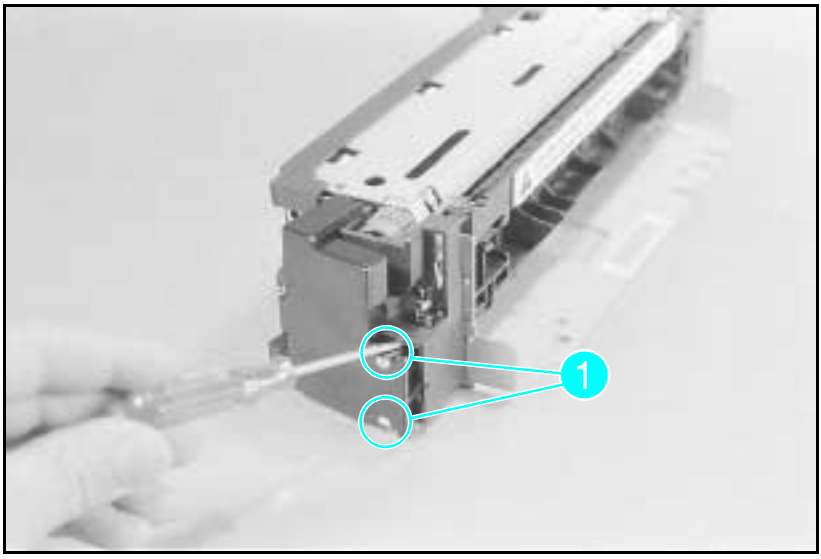


Figure 1-41 Fuser End Cap Removal (LaserJet 4 only)

1 **Laser Jet 4 only**: Remove the (2) latches that hold the right side cover. (There is a gear exposed on the right side of the fuser, see Figure 6-41, callout *1*.)

2 Release the (7) latches on the LaserJet 4 or the (5) latches on the LaserJet 4 Plus that hold the wire cover to the Fuser Assembly. These latches can be accessed through slots on top of the fuser.

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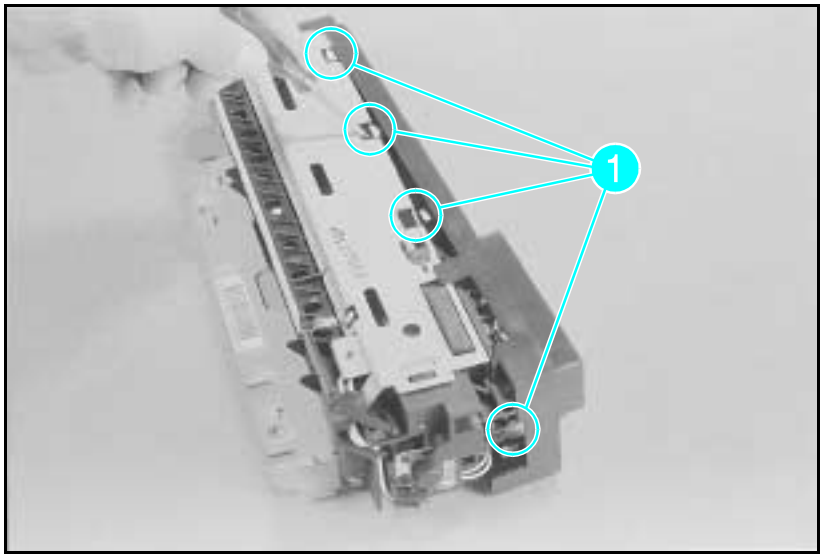


Figure 1-42 Fuser Wire Harness Cover Removal (LaserJet 4)

3 **LaserJet 4**: With a screwdriver, release the latches by first pressing to clear the lower latch, then lifting to release the upper latch (see Figure 6-42a).
**LaserJet 4 Plus**: With a screwdriver, release the latches by first pressing to clear the lower latch, then lifting to release the upper latch. Repeat until all (4) latches are free, then rotate the cover to release the latch on the side (see Figure 6-42b and 6-42c).

4 Release the two end latches (see Figure 6-42b).

**Note** Six of the seven latches are accessed from the top of the wire cover. These latches are beneath the felt pad. The slot on the front left side of the wire harness cover is the best place to begin removing the cover.

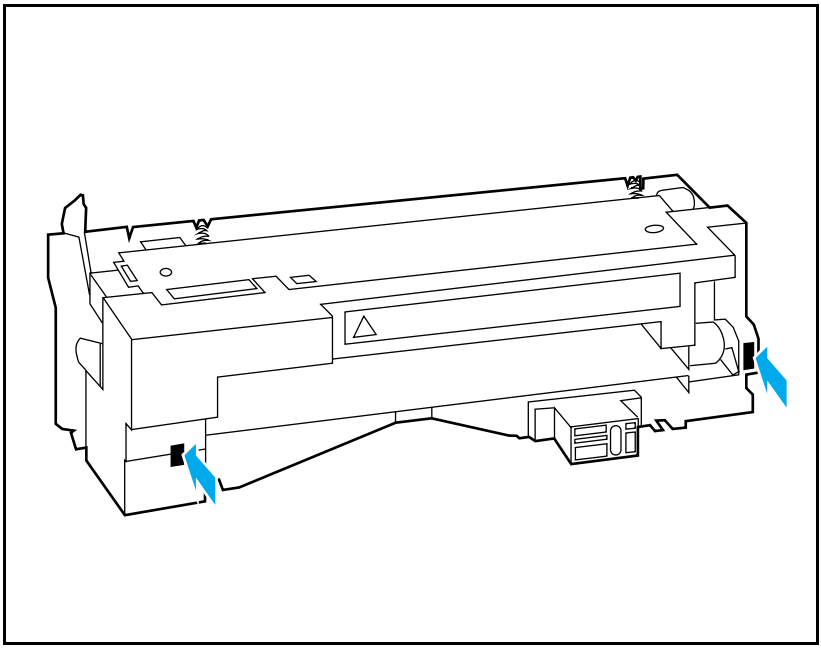

Figure 1-42b Fuser Cover End Latches (LaserJet 4 Plus)

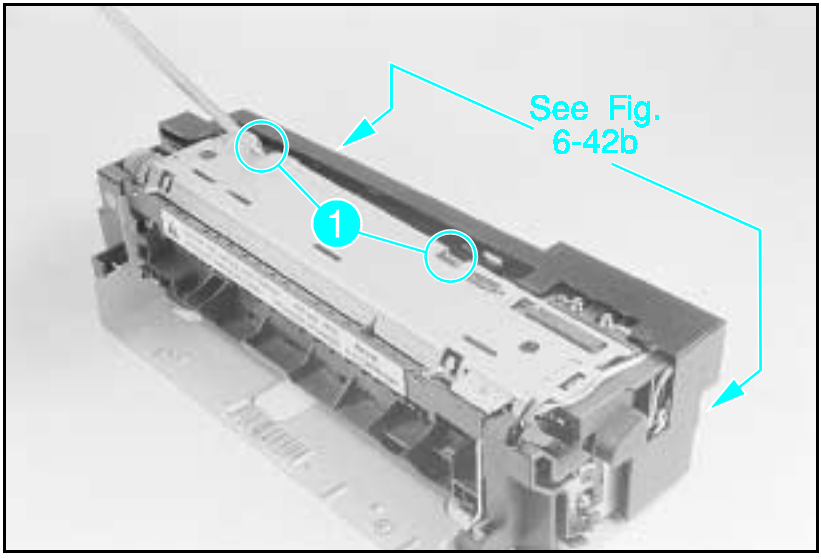


Figure 1-42c Fuser Wire Harness Cover Removal (LaserJet 4 Plus)

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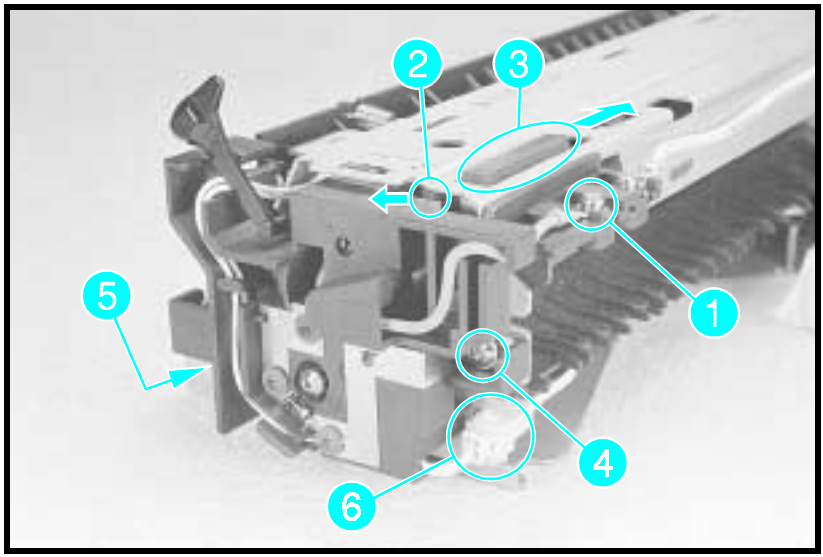


**Figure 1-43 Left Side Fuser Cover**

**5** Remove the (1) Heat Lamp lead (thermoswitch screw)(see Figure 6-43 callout *1*).

**6** Press the thermoswitch tab towards the paper exit flag to release the tab (see Figure 6-43 callout *2*). Slide the Thermoswitch off the fuser frame (see Figure 6-43, callout *3*).

**7** **LaserJet 4**: Remove the cable retainer from the fuser frame, and free the heat lamp lead from the cable retainer. Note the orientation of the cable retainer.
**LaserJet 4 Plus/5:** Remove the (2) screws from the end cover (see Figure 6-43, callouts *4 and 5*). Note the wavy washer on the (1) screw touching the copper contact (see Figure 6-43, callout *4*). Remove the thermistor connector from the frame and pull apart (see Figure 6-43, callout *6*). Note the position of the Fuser Shipping Lever and remove from assembly.

*(continued on next page)*

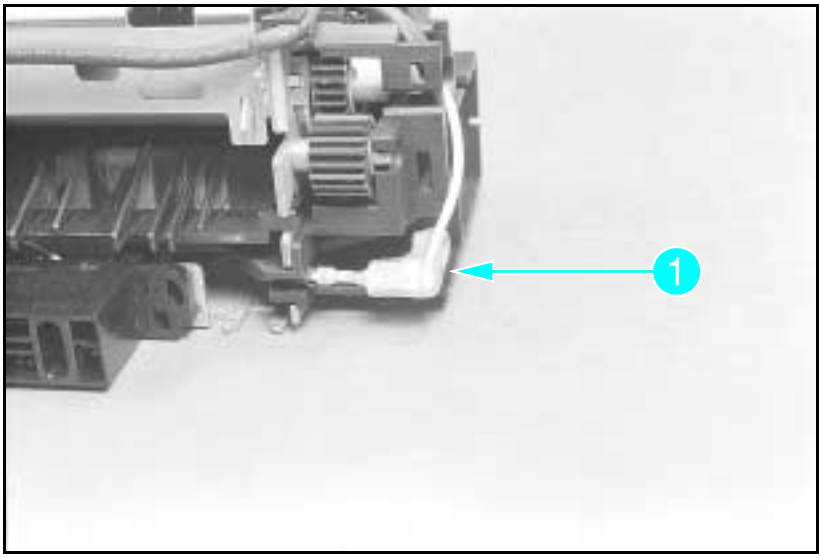


**Figure 1-44** **Gear Side Heat Lamp Connector**

**Note**

**LaserJet 4 and 5 only:** Note the orientation of the bushing on the left side of the Fusing Roller.

**8** Squeeze the lamp connector to release the slip-on connector locking tab from the right side of the heat lamp (see Figure 6-44, callout *1*).

*(continued on next page)*

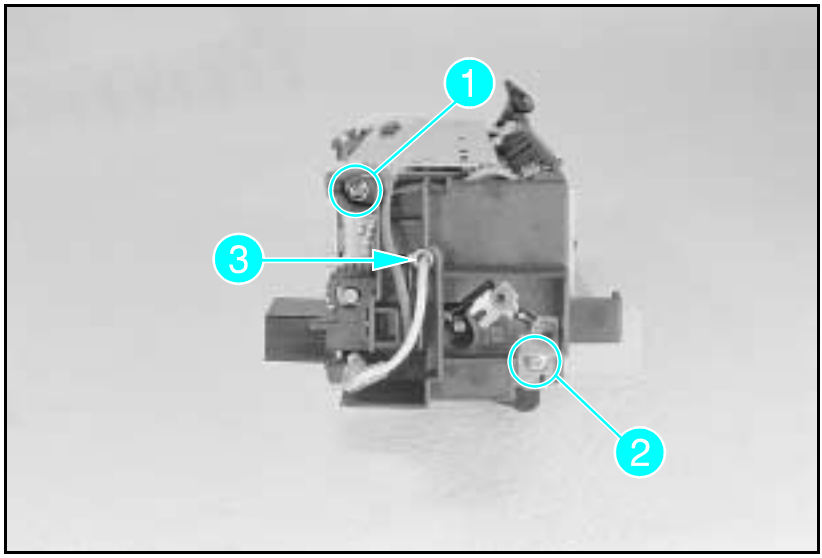


**Figure 1-45 Fuser Gear Cap Removal**

**Note** Before removing the gear cover, note the routing of the wires in the gear cover slots.

**9** Remove the (2) screws from the right side gear cover (see Figure 6-45, callouts *1 and 2*). Note the wavy washer on the (1) screw (callout *1*) touching the copper contact. Remove the cover.

**10** Remove the Heat Lamp (see Figure 6-45, callout *3*), from the roller. Pull the lamp out the side of the assembly.

### Fuser Assembly Thermoswitch Removal

**Note** Six of the seven latches are accessed from the top of the wire cover. These latches are beneath the felt pad. The slot on the front left side of the wire harness cover is the best place to begin removing the cover.

1 Remove the Wire Harness Cover as shown in Figure 6-42a (LaserJet 4) or Figure 6-42b and c (LaserJet 4 Plus).
2 Remove the (2) screws from the Thermoswitch connector (see Figure 6-46, callout *1*).
3 Release the thermoswitch latch from the paper sensor flag side of the Fuser Assembly (behind the side cover). (See Figure 6-46, callout *2*).
4 Slide the Thermoswitch to the gear side of the fuser and release it from the fuser frame (callout 3).

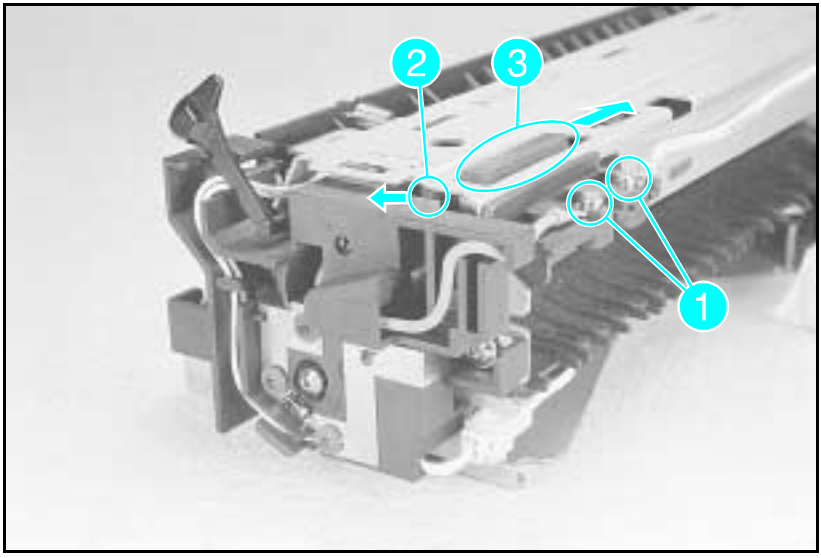


Figure 1-46 Fuser Thermoswitch Connectors

## Thermistor Removal

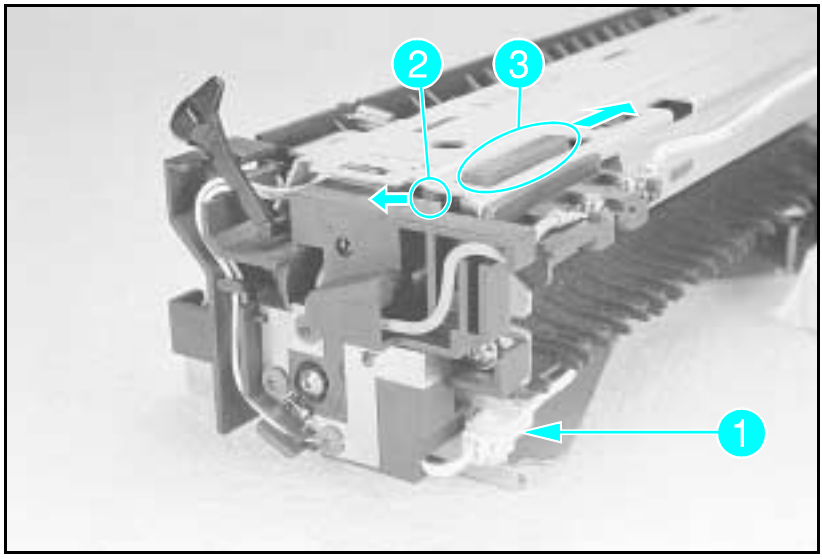


Figure 1-47 Thermistor Connector

1 Remove the Wire Harness Cover as shown in Figure 6-47.
2 Remove the (2) screws from the thermoswitch connector (see Figure 6-47, callout *1*).
3 Release the thermoswitch latch from the paper sensor flag side of the Fuser Assembly (behind the side cover, see Figure 6-47, callout *2*).
4 Slide the thermoswitch to the gear side of the fuser and release it from the fuser frame (callout 3).

**Note** When installing the thermoswitch, make sure the sensing surface contacts the fusing roller uniformly. If it does not, straighten the leaf spring.

*(continued on next page)*

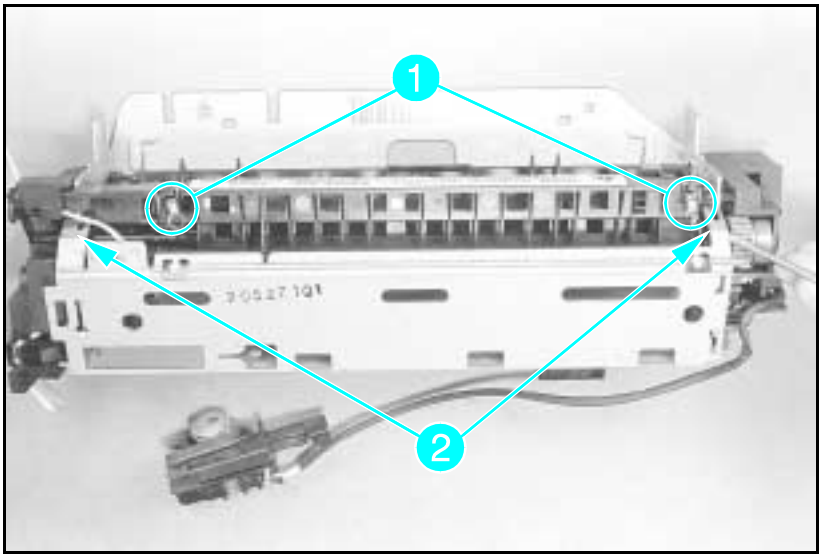


**Figure 1-48a Upper Fuser Frame Removal (LaserJet 4)**

**5** Release the (2) springs from the Upper Fusing Frame (see Figure 6-48a, callout *1*).

**6** Release the tabs that hold the Upper Fusing Frame to the Fuser Body (see Figure 6-48a). Rotate the Upper Frame backwards to release and access the Thermistor (see Figure 6-48b, callout *1*).

*(continued on next page)*

**7** Remove the (1) screw that holds the Thermistor (see Figure 6-48b, callout *2*).

**Note** Ensure the thermistor cable is routed correctly when assembling the fuser (see Figure 6-47).

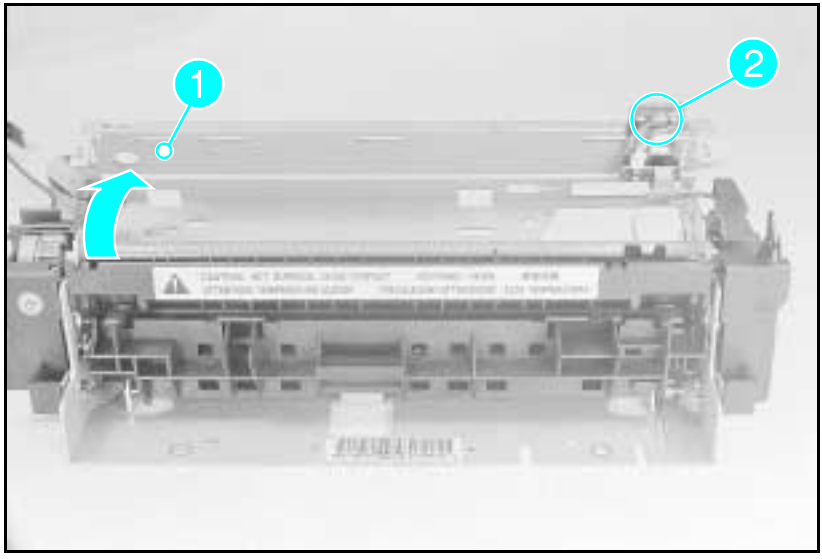


**Figure 1-48b Upper Fuser Frame Removal (LaserJet 4 Plus)**

## Paper Control PCA Removal

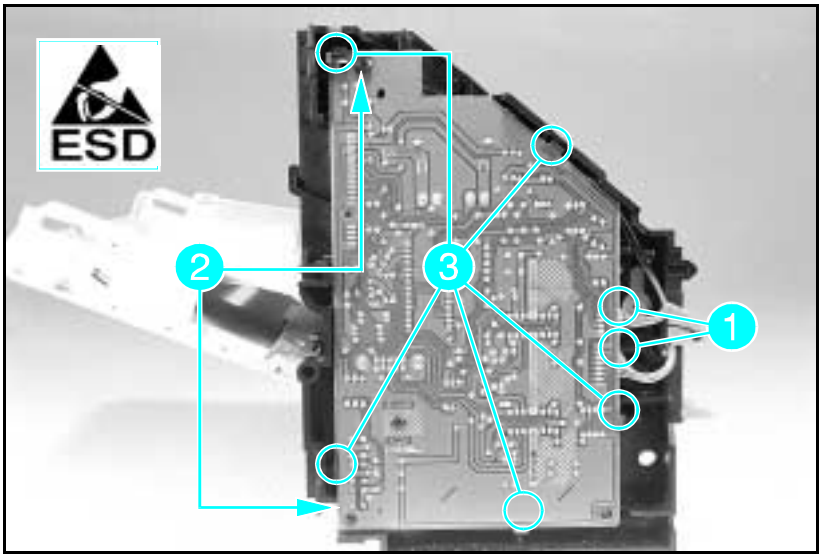


Figure 1-49 Paper Control PCA Retaining Screws and Latches

**1** Remove the Right Side, Top, Left Side, and Font Door Covers, then Paper Feed Assembly.

**2** Disconnect the cables from the sensors (see Figure 6-49, callout *1*).

**3** Remove the (2) self-tapping screws from the Paper Control PCA (see Figure 6-49, callout *2*).

**4** Release the (5) latches that retain the Paper Control PCA (see Figure 6-49, callout *3*).

## Sensor PCA Removal

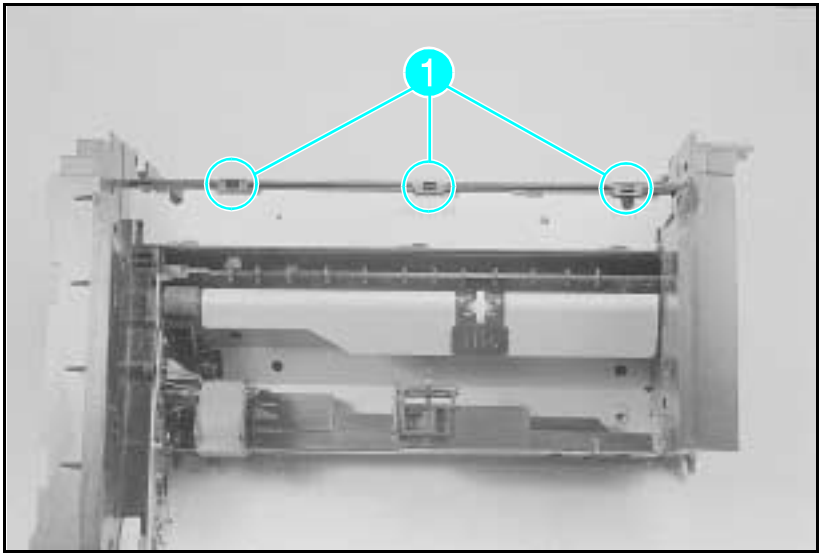


Figure 6-50 Sensor PCA Removal

1 Remove the Right, Left, Top, and Font Door covers. You need not remove the MP Tray.
2 Perform the Paper Control PCA removal procedure, as shown in the preceding section.
3 Disconnect the connectors for SL1, SL2, and M2 from the left end of the Sensor PCA.
4 Release the (3) clips that hold the Sensor PCA cover. Remove the cover (see Figure 6-50, callout *1*).
5 Remove the Sensor PCA by sliding it to the left and dropping it down.

## PS1 and PS2 Sensor Assembly Removal

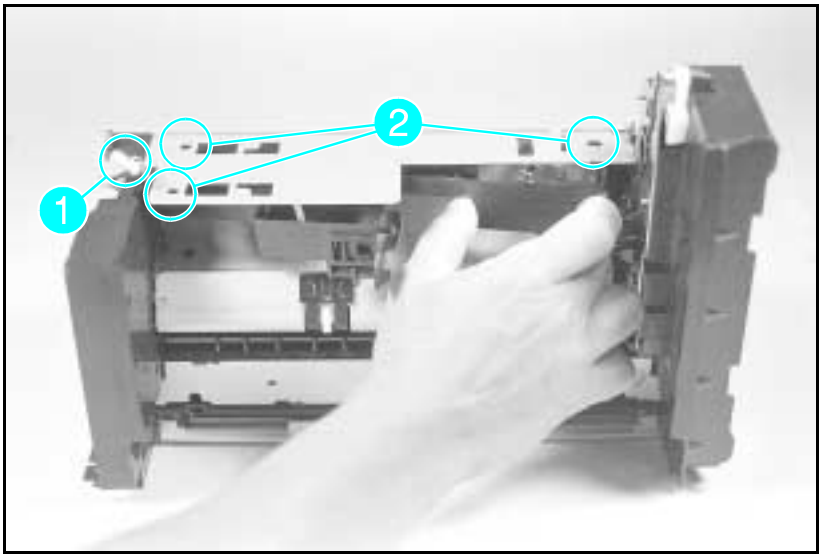


Figure 6-51 Removing the PS1/PS2 Sensor Assembly

The PS1 and PS2 sensors are located under the Paper Feed Assembly.

**1** Remove the Paper Feed Assembly and place it on a flat surface, with the MP Tray side down.

**Note** You need not remove the MP Tray from the Paper Feed Assembly. Use a cloth to protect the MP Tray door from scratches.

**2** Remove the PC Tray Pickup Roller.
**3** Disconnect blue-wired connector on the bottom, (callout *1*).
**4** Remove the center pin from the dowel post.
**5** Flex the right side of the Sensor Assembly to clear the locator pin and the sensor arm from the sheet metal (see Figure 6-51 callout *2*).
**6** As you flex the right side of the assembly, carefully release the (2) plastic retaining tabs on the left (Figure 6-51 callout *2*).
**7** Slide the Assembly to the right to clear the mounts.

**Note** When installing the Sensor Assembly, ensure the sensor flags are free through their entire range of travel.

# High Voltage Contact Plate (HVCP) and Paper Guide Removal

This procedure involves removing many subassemblies and difficult disassembly processes. Because this procedure is complex, it is separated into three sections:

- Accessing the HVCP and Feed Guide Assembly.
- Removing the HVCP and Feed Guide Assembly.
- Replacing the HVCP and Feed Guide Assembly.

Allow plenty of time to perform this procedure, and be careful not to damage any parts during reassembly.

## Accessing the High Voltage Contact Plate and Feed Guide Assembly

Accessing the High Voltage Contact Plate and Feed Guide Assembly requires prior removal of the following:

- Top Cover
- Right Side Cover
- Left Side Cover
- Paper Feed Assembly
- Toner Cartridge
- Fuser Assembly
- Transfer Roller

*(continued on next page)*

After removing the Fuser Assembly, remove the contact plate from the rear of the printer, as follows:

1. Remove the (1) screw from the sheet metal Guide Plate Cover. (This screw is behind the Fuser Assembly, see Figure 6-52, callout *1*).
2. Remove the Guide Plate Cover by freeing the front edge, lifting upward, and sliding the cover out the rear of the printer.

**Note** Do not lose any of the (6) rollers the Guide Plate Cover holds in place.

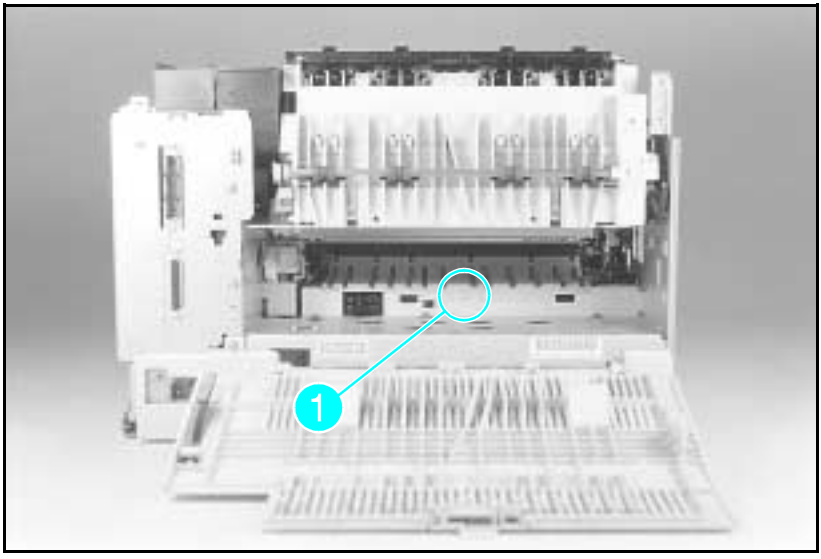


**Figure 6-52 Guide Plate Cover Screw**

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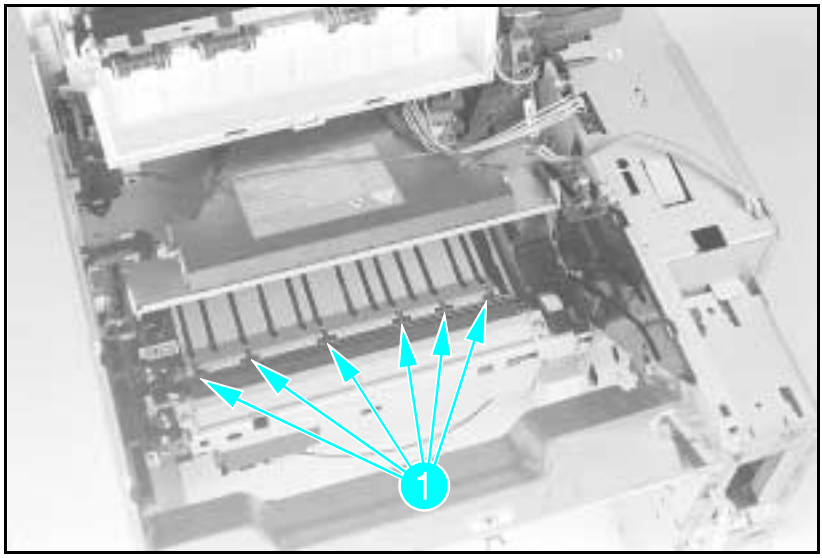


Figure 6-53 Paper Guide Rollers

**3** Remove the (6) rollers from the High Voltage Contact Plate (see Figure 6-53 callout *1*).

*(continued on next page)*

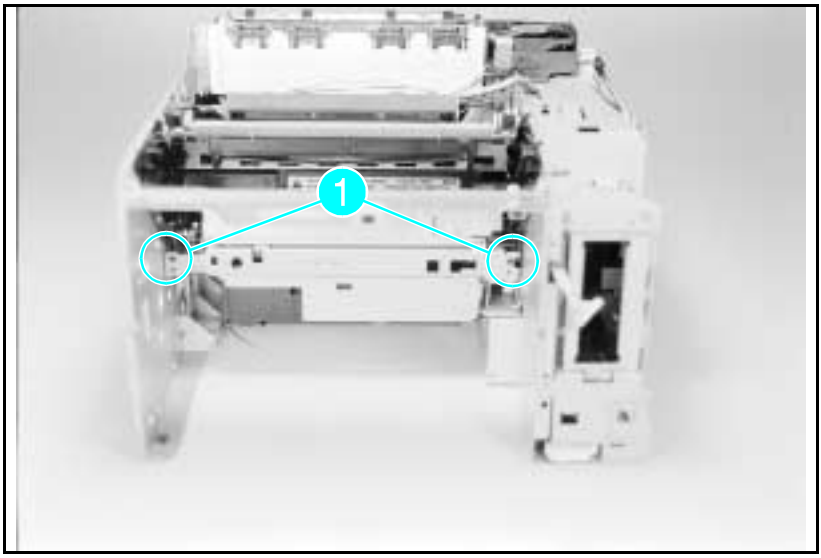


**Figure 6-54 Cross Member Screws**

**4** From the front of the printer, remove the (2) black self-tapping screws that hold the Inner Cross-member. Remove the cross-member (see Figure 6-54 callout *1*).

*(continued on next page)*

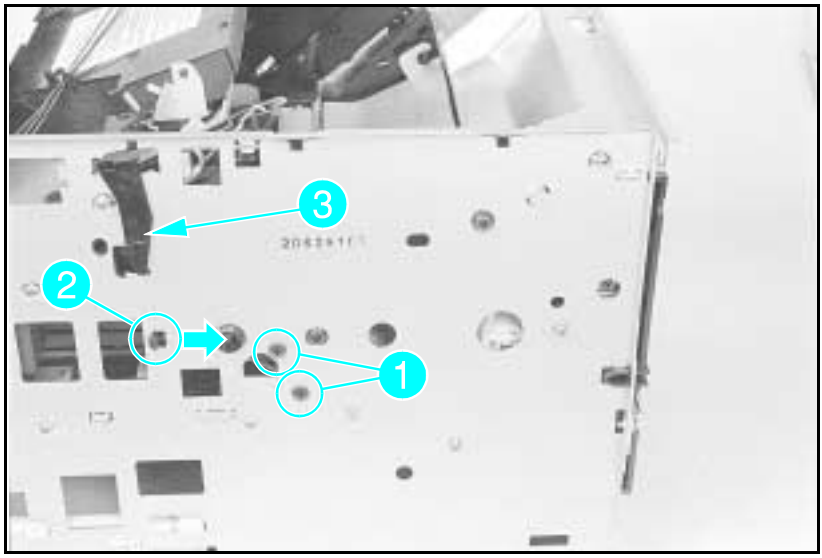


**Figure 6-55 Left Toner Cartridge Guide Plate Screw**

**5** From the left side of the printer, remove the (1) or (2) black, self-tapping screw(s) that holds the Left Toner Cartridge Guide Plate (see Figure 6-55, callout *1*).
**6** Release the guide plate latch (see Figure 6-55, callout *2*).
**7** Remove the Laser Shutter Pivot Pin from its seat in the Left Toner Cartridge Guide Plate (see Figure 6-55, callout *3*).

These two steps (5 & 6) are required for the next stage of the HVCP removal process.

## Removing the High Voltage Contact Assembly and Feed Guide Assembly

**Note** The following procedures are difficult and the components are damaged easily. The tolerances between the parts are close and several attempts may be necessary before the procedure is complete.

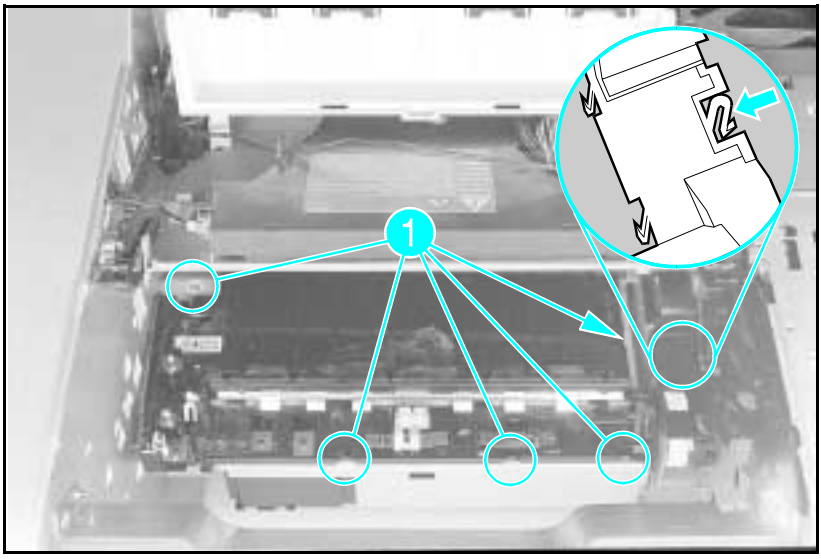


**Figure 6-56** High Voltage Contact and Feed Guide Assembly Latches

1 Perform all the steps of "Accessing the High Voltage Contact Plate/Feed Guide Assembly" in the order given.
2 Press the tab shown in Figure 6-56 to release the gear cover.
3 Release the (5) latches that hold the Contact Plate in place (see Figure 6-56). Set the Contact Plate on the latch slots.
4 Free the Left Toner Cartridge Guide Assembly from its retainers.
5 Lift the Contactor Plate and the Toner Cartridge Guide Assembly out of the printer, Toner Cartridge Guide Assembly first.

## Replacing the High Voltage Contact Assembly/Feed Guide Assembly

The Toner Cartridge Guide Plate and the High Voltage Contact Assembly/Feed Guide Assembly must be installed together. Allow plenty of time to perform this procedure because several iterations of the process may be necessary.

1. Set the contact assembly over its mounting holes.
2. Slide the Toner Cartridge Guide Plate into position on a diagonal line (see Figure 6-57).
3. Working the two parts together, lift the rear of the HVCP to provide enough clearance to install the Guide Plate.
4. When the Guide Plate is in position, press it into place on the sheet metal.
5. Press the HVCP into its mounting slots.
6. Install the Laser Shutter Pivot Pin and test the Laser Shutter for free operation.
7. Replace the gear cover (see Figure 6-56).

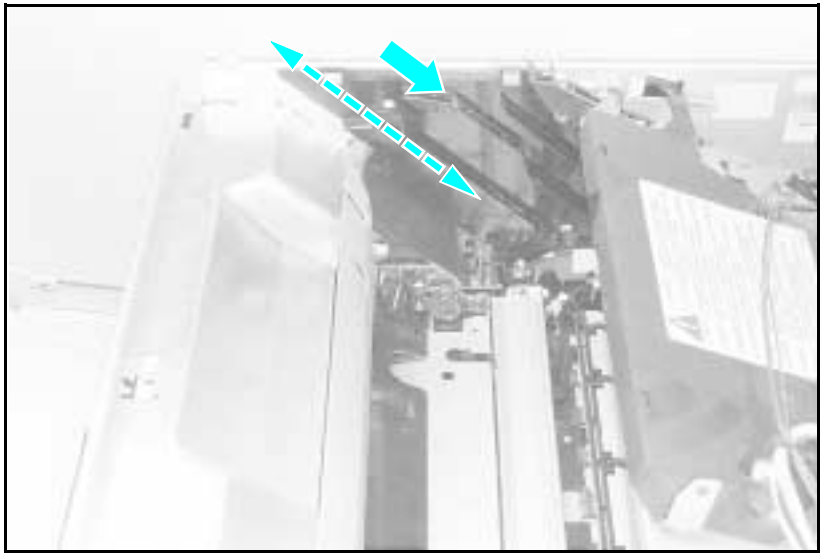

Figure 6-57 Orientation of HVCP and Left Guide Plate

# Interconnect PCA Removal

The Interconnect PCA is a connector board that connects the Power Supply and the DC Controller with the the Fuser Assembly. The Fuser Assembly connects directly into the Interconnect PCA. The Power Supply and the DC Controller have wiring harnesses that connect them to the Interconnect PCA.

**Note** Re-assembly of the the Interconnect PCA *requires* a small tie-wrap. Be sure to have a tie-wrap available before beginning the disassembly.

Remove the interconnect as follows:

1. Remove the Formatter Cage, the Power Supply, the Fuser Assembly, the High Voltage Power Supply, and the Rear Door.
2. Remove the (1) screw from the right-side PC tray Rail Cover (see Figure 6-58, callout *1*).
3. Release the latch (see Figure 6-58, callout *2*), slide the Rail Cover to the rear of the printer and remove the cover.

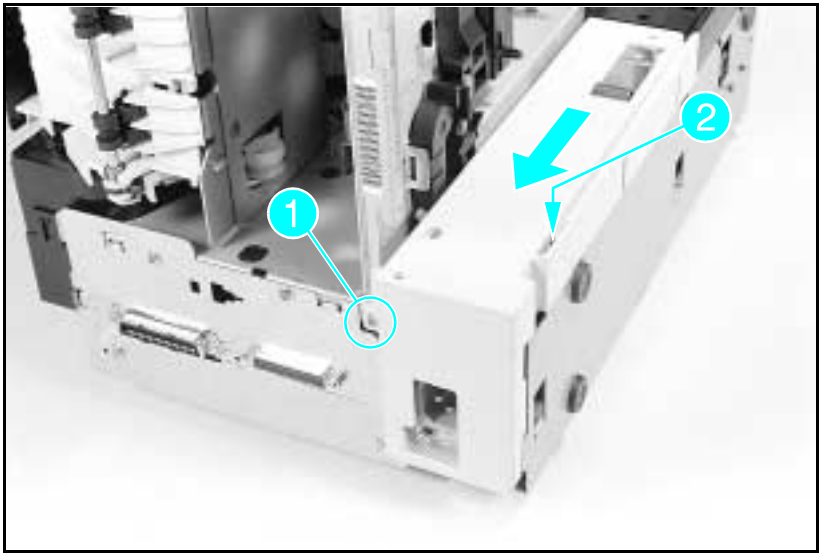


**Figure 6-58 Right Side PC tray Rail Cover (printer on right side)**

*(continued on next page)*

**Note** Access the Interconnect PCA Housing by laying the printer on the rear of the printer chassis.

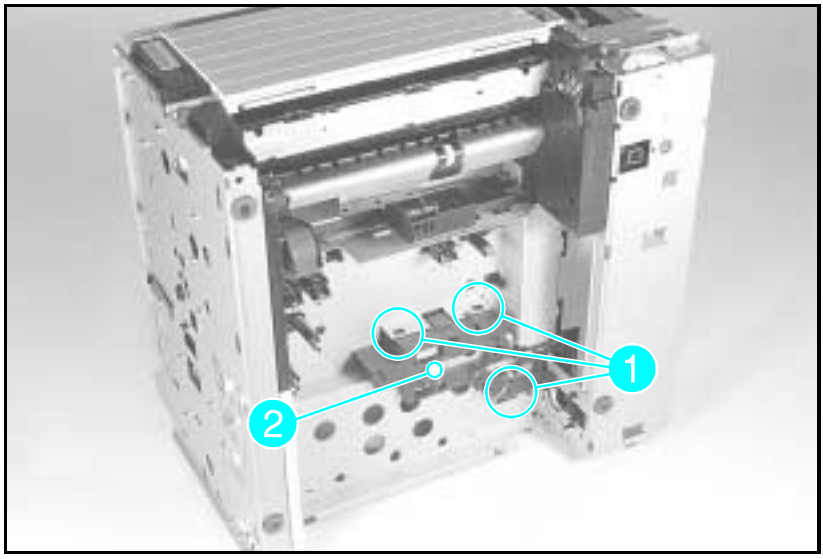


**Figure 6-59 Interconnect PCA latches and AC Connector Mounting Pins**

**4** Disconnect the Interconnect Cable connector from the DC Controller (J210 on LJ4, J213 on LJ4+/5). Remove the cable from its retainer.

**5** Release the bottom or rear-most latch (see Figure 6-59), callout 1) holding the arm of the Interconnect PCA housing to the sheet metal.

**6** Rotate the bottom (rear) of the PCA housing up (toward the front) to release the housing from the printer.

*(continued on next page)*

**Note** The AC Connector has polarity. Note the orientation of the AC Connector before removing it. This is *required* in order to install the connector with the same polarity during assembly (see Figure 6-60).

**7** Release the AC Connector from the sheet metal with needle-nose pliers. **Service Hint:** Use a 5mm nut driver to press the AC Connector retaining pins from the sheet metal.

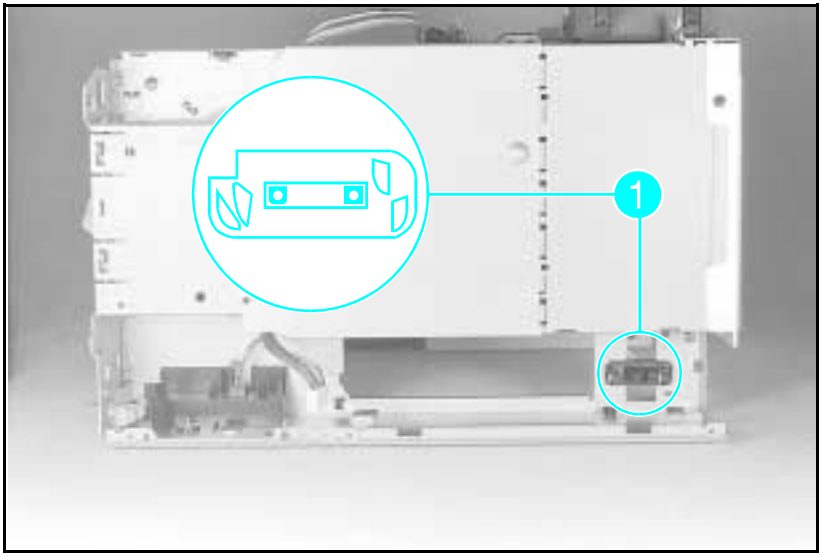


**Figure 6-60 Correct Orientation of AC Connector (Notch at Upper Left)**

# LaserJet 5 Error Map

The LaserJet 5/5M/5N printer has error messages that are similar to the LaserJet 4/4M/4+/4M+. Use the following table to look up the LJ5 error and take the recommended action. If the recommendation is to see another error, for example See 00 POWERSAVE, look up the recommendation for that error in the Printer Message Troubleshooting section (Tables 7-1 and 7-2).

**Note** The LaserJet 5 printer's Go key replaces both the Online and Continue keys previously used to resolve some of the temporary errors in the LaserJet 4 and 4 Plus printers.

**Note** For any LaserJet 5 error message preceded with a number from 20 through 81, look up the equivalently-numbered message in Table 7-1 and proceed as directed.

| Message on LJ 5/5M/5N | Recommendations |
|---|---|
| CLEARING MEMORY | See 07 RESET |
| CLOSE PRINTER COVER | See 12 PRINTER OPEN |
| CONTINUOUS TEST, PRESS JOB CANCEL KEY | See 04 SELF TEST |
| DATA RECEIVED | The received data is waiting for a form feed. (Takes the place of the Form Feed indicator on the LJ4.) |
| ENGINE TEST | See 15 ENGINE TEST |
| FACTORY DEFAULTS BEING RESTORED | See 09 MENU RESET |
| INCOMPATIBLE ENVELOPE FEEDER INSTALLED | Indicates that an envelope feeder has been installed that is not compatible with the LJ5. Press GO to clear the error. The feeder will not appear in any control panel or PJL messages. |

| Message on LJ 5/5M/5N | Recommendations |
|---|---|
| INCOMPATIBLE TRAY 3 INSTALLED | Indicates that a lower cassette has been installed that is not compatible with the LJ5. Press GO to clear the error. The tray will not appear in any control panel or PJL messages. |
| INITIALIZING (powerup only) | See 05 SELF TEST |
| INSTALL TONER CARTRIDGE | See 14 EP CART |
| INSTALL TRAY 2 | See PC INSTALL |
| INSUFFICIENT MEMORY, JOB CLEARED | See W3 JOB ABORTED |
| INSUFFICIENT MEMORY, PRINTING AT 300 DPI | See W4/7 JOB 300/[page protect size] |
| MANUALLY FEED [envelope size] | See ME FEED [envelope size] |
| MANUALLY FEED [paper size] | See MF FEED [paper size] |
| MEMORY LOW, PAGE SIMPLIFIED | See W1 IMAGE ADAPT |
| MEMORY SETTINGS CHANGED | See WM MEM CNFIG N/A or WM CHK MEM CNFIG |
| OFFLINE | See 00 OFFLINE |
| [personality] MEMORY FULL, STORED DATA LOST | See WM [Personality] MEM FULL |
| PLEASE WAIT | This message is displayed whenever the device is in the process of flushing the pipeline so it can go offline or into the menus. (Takes the place of the flashing Online indicator.) |
| POWERSAVE ON | See 00 POWERSAVE |
| PRINTING CONFIGURATION PAGE | See 05 SELF TEST / 06 PRINTING TEST |
| PRINTING DEMO PAGE | See 06 DEMO PAGE |
| PRINTING FLASH PAGE | This message is displayed while a flash file system page is being formatted and printed. Upon successful completion, the device returns to an online and ready state. |
| PRINTING FONT LIST | See 06 TYPEFACE LIST |
| PROCESSING JOB | This message is displayed whenever the device is actively processing a user's job. (Takes the place of the flashing Ready indicator.) |
| READY | See 00 READY |
| REMOVE DUPLEX JAM | See 13 DUPLEX JAM |

| Message on LJ 5/5M/5N | Recommendations |
|---|---|
| REMOVE PAPER JAM | See 13 PAPER JAM |
| REQUESTED LANGUAGE NOT AVAILABLE | See W2 INVALID PERS |
| RESETTING ACTIVE I/O | See 07 RESET |
| RESETTING ALL I/O | See 07 RESET |
| RESTORING FACTORY SETTINGS | See 08 COLD RESET |
| TONER LOW | See 16 TONER LOW |
| TRAY 2/3 EMPTY | Indicates Tray 2 or 3 has run out of paper and has not been selected as the current job's paper source. If the problem persists, check for a binding sensor flag or replace the appropriate sensor. |
| TRAY x LOAD [paper or envelope size] | See xx LOAD [paper or envelope size] |
| WARMING UP | See 02 WARMING UP |
| x LOAD [envelope size]<br>x=Tray 1 or Envelope Feeder | See xx LOAD [paper or envelope size] |

7

# Troubleshooting

## Pre-Troubleshooting Procedures

### Preliminary Operating Checks

Prior to troubleshooting a specific printer problem, you should ensure that:

- The printer is being maintained on a regular basis as described in Chapter 4.
- The customer is using acceptable media as specified in the User's Manual.
- The printer is installed on a solid, level surface.
- The line voltage does not vary more than 10% from the nominal rated value as specified on the Power Rating Label.
- The operating environment for the printer and paper is within the temperature and humidity specifications listed in Chapter 1 of this manual.
- The printer is never exposed to ammonia fumes such as those produced by diazo copiers, or office cleaning materials.
- The printer is not exposed to direct sunlight.
- Non-HP components (such as refilled toner cartridges, font cartridges, and memory boards) are removed from the printer.

# Printer Message Troubleshooting

## Printer Message Summary Table

Table 7-1 is a list of all status, attendance, error, and service messages affecting the printers. The table also identifies the action required to correct the situation identified by the message. When the action requires removal and replacement of an assembly or PCA, refer to the applicable section of Chapter 6 for instructions. For general location of components, refer to *Troubleshooting Aids* at the end of this chapter.

**Table 7-1** Printer Messages

| Message | Symptoms and Recommendations |
|---|---|
| Blank Display | Refer to the “Blank Display” Table 7-3. |
| 00 READY | Proceed; printer is ready to use. |
| 00 POWERSAVE<br><br>POWERSAVE ON | Printer is in Power Save Mode. Press any key to take printer out of Power Save mode. Receipt of data or an error condition will also take printer out of Power Save mode. The job will print when the fuser is warmed up (may take up to 45 seconds). |
| 00 OFFLINE | Printer is off line and not able to receive data. Press On Line*. |
| 02 WARMING UP | Wait until printer signals ready. |
| 05 SELF TEST | The non-printing portion of Self Test is in progress. Wait for the printer to display the 00 READY message. |
| 06 PRINTING TEST<br>PRINTING<br>CONFIGURATION PAGE | Self Test printing. Wait for the printer to display the 00 READY message. |
| 06 TYPE PRINTOUT | Printing sample characters from available typefaces. Wait for the printer to display the 00 READY message. (Note: the format is different for PCL and PostScript.) |
| 06 TYPEFACE LIST<br>PRINTING FONT LIST | Printing a Typeface List. (Note that PCL/Postscript formats are different.) |
| 06 DEMO PAGE<br>PRINTING DEMO PAGE | Printing a Demonstration Page. (Note that PCL/Postscript formats are different.) |
| 06 CONFIG PAGE | Printing a Configuration Page. Appears only with PostScript installed in the printer. |

*Press Go on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 07 RESET<br>RESETTING [xxx] | Returns all printer settings to Printing Menu settings, and clears buffered pages, temporary soft fonts, and macros. Wait for the printer to display the 00 READY message. See the *Reset Menu* section in Chapter 3 for more details. |
| 08 NVRAM_INIT | Printer is initializing non-volatile RAM. This allows other personalities to access non-volatile RAM. |
| 08 COLD RESET<br><br>RESTORING FACTORY SETTINGS | Returns both Configuration and Printing Menu selections to the factory settings. Ensure that the Configuration Menu settings are correct before placing the printer on-line. Wait for the printer to display the 00 READY message. See the *Reset Menu* section in Chapter 3 for more details. |
| RESET=MENU<br>09 MENU RESET<br>09 RESET ACTIVE I/O<br>09 RESET ALL I/O<br>FACTORY DEFAULTS BEING RESTORED | Follows a Control Panel Reset selection. The printer returns all Printing, PCL, PS, and Job Menu items to the factory settings. Clears buffered page data, temporary soft fonts, and temporary macros. See Chapter 3 for more details. |
| 10 RESET TO SAVE | The Printing, PCL, PS, and Config Menus were changed while data, temporary fonts, or temporary macros were present in printer memory, or while the printer was in the middle of a job. Press Continue* or On Line*. Your changes remain recorded in the menu but do not become active until the printer is reset, or the job boundary is detected. |
| 12 PRINTER OPEN<br>CLOSE PRINTER COVER | Close the Top Cover Assembly. If the problem continues, refer to the "12 PRINTER OPEN Message" section. |
| 13 PAPER JAM<br><br>REMOVE PAPER JAM | Open printer and clear any paper within the printer. Press Continue* or On Line* to reprint the page. If the problem persists, refer to "13 PAPER JAM Message" section. |
| 13 DUPLEX JAM<br>REMOVE DUPLEX JAM | Check for any paper in the Duplexer area. If problem persists, refer to the Duplex Section (Appendix A). |
| 14 NO EP CART<br><br>INSTALL TONER CARTRIDGE | Ensure that the Toner Cartridge is installed correctly (fully seated into the printer). Try a new Toner Cartridge. If the problem continues, refer to the "14 NO EP CART Message" section. |
| 15 ENGINE TEST | This message is displayed during the execution of a print engine self-test. When this test is complete, the printer returns to the ready state, but remains off line. |
| 16 TONER LOW | The toner cartridge is almost empty. Replace the Toner Cartridge. Although you can continue to print for a short while, make sure that the print quality does not degrade past the acceptable level. If the problem continues, refer to "16 TONER LOW" Message" section. |

*Press Go on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 18 AUX IO INIT | This message is displayed when the MIO (AUX IO) card is in the process of initializing. During initialization the MIO is not active, but since the printer supports I/O switching, the printer remains on line and this becomes a status message. Display clears automatically (this may take up to a minute, depending upon the card). |
| 18 AUX IO NT RDY | The MIO (AUX IO) card is not ready. See the user's manual for the MIO card. The serial and Bi-Tronics parallel ports continue to operate normally. To clear the display, you must remove the card, and power-cycle the printer. The Continue* key does not clear the display. |
| 18 MIO INIT | The MIO card is initializing. This is a status message. During initialization the MIO is not active, but since the printer supports I/O switching, the printer remains on line. Displays clears automatically (may take up to a minute, depending on the card). |
| 18 MIO NOT READY | The MIO card is not ready or not connected to a working network. The serial and Bi-Tronics parallel ports will continue to operate normally. To clear the display, switch the printer OFF, remove the card and switch printer ON. Continue* will not clear the display. See MIO documentation for troubleshooting. |
| 20 MEM OVERFLOW<br><br>20 INSUFFICIENT MEMORY | Indicates a memory overflow. Too much data is being sent to the printer and the printer has run out of memory. Pressing the Continue* key causes the printer to print only the information it received. If the error persists, it may be necessary to *simplify* the print job (such as fewer fonts and less graphics information), or have the customer purchase additional memory. |
| 21 PRINT OVERRUN<br><br>21 PAGE TOO COMPLEX | Indicates that the information being sent to the printer is too complex for the printer (the formatting capabilities of the printer cannot keep up with the formatting instructions being sent to it by the computer).<br><br>If the error persists, it may be necessary to *simplify* the job (reduce the number of characters, number of fonts used, number of pixels addressed, cursor repositions, or reduce addressing the same pixel location multiple times). This problem can also be resolved by adding at least one additional memory PCA, and setting PAGEPROTECT=[LTR, LGL, or A4], if applicable. |

*Press Go on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 22 ERROR<br><br>22 SERIAL I/O ERROR<br><br>22 PARALLEL I/O ERROR<br><br>22 HP MIO ERROR | For serial/Bi-Tronics parallel configuration, the computer and printer are not communicating because of improper signal protocols. This is an I/O buffer overrun error.<br><br>Parallel configuration: may mean a loose cable connection. Serial configuration: wrong pacing option may be selected. (If you are using an RS232 serial connection, the HP LaserJet printer uses XON/XOFF and DTR signal protocols rather than ENC/ACK protocol.) Press Continue* to clear the error message (data is lost). |
| 40 ERROR<br><br>40 BAD SERIAL DATA FORMAT<br><br>40 HP MIO ERROR | The printer encountered an error while transferring data from the computer. For serial I/O configuration, the error may have occurred because you turned ON or OFF your computer while the printer was on line, or your printer's baud rate or parity was not the same as the computer's. For network MIO cards, this means there was an abnormal connection break. Make sure the printer is set at the same baud rate as the computer. Press Continue* to clear the error message. For network MIO cards, see the user's manual for your card. |
| 41.[X] ERROR<br>41.x PRINTER ERROR<br>x=1, 2, 4 ,5 | A temporary error occurred while printing. Press the Continue* key to clear the error. If the error persists, refer to "41.X ERROR Message." |
| 41.3 ERROR<br>41.3 UNEXPECTED PAPER SIZE | The paper size selection knob or MP paper size does not match the installed paper or more than one sheet of paper was picked up. |
| 50 SERVICE<br>50 FUSER ERROR | Power OFF the printer for a minimum of 10 minutes. If the problem continues, refer to the "50 SERVICE error" section. |
| 51 ERROR<br><br>51 PRINTER ERROR | Indicates loss of laser beam for over 2 seconds. Press Continue* to clear this error. If the error persists, refer to the "51 ERROR Message" section. |
| 52 ERROR<br><br>52 PRINTER ERROR | Indicates scanner motor is unable to maintain the proper speed. Press Continue* to clear this error. If the error persists, refer to the "52 ERROR Scanner Malfunction" section. |

*Press Go on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 53.XY.ZZ ERROR | An error occurred during configuration and validation of SIMM memory:<br>**X Hardware Type:**<br>0:ROM<br>1:RAM<br>2:Flash<br>**Y Hardware Device:**<br>0: Internal Memory<br>1: SIMM Slot 1<br>2: SIMM Slot 2<br>3: SIMM Slot 3<br>4: SIMM Slot 4<br>**ZZ Error Number**:<br>0: Unsupported Memory<br>1: Unrecognized Memory<br>2: Unsupported Memory Size<br>3: Failed RAM Test<br>4: Exceeded Maximum RAM Size<br>5: Exceeded Maximum ROM Size<br>6: Invalid SIMM Speed<br>7: SIMM Reporting Information Incorrectly<br>8: SIMM RAM Parity Error<br>**LaserJet 4/4m only**<br>9: SIMM ROM Needs To Be Mapped To An Unsupported Address<br>10:SIMM Address Conflict<br>11:PDC XROM out of bounds<br>12:Could not make a temporary mapping<br><br>Replace the SIMM device that caused the error. Pressing Continue* allows you to continue but the SIMM device that caused the error is not configured. If the SIMM device has more than one bank of memory, the good banks are configured. |

*Press Go on the LJ5.

**Note** Refer to the "Product Family Compatibility Matrix" in Chapter 1, or for the LaserJet 5, Appendix B to verify correct memory for the printer.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 55 ERROR<br>55 PRINTER ERROR | Indicates a communications problem between the DC Controller PCA and the Formatter PCA. Pressing Continue* clears the error and resumes printing.<br><br>Perform the Test Print operation to verify DC Controller functionality. If the message persists, check for any cable damage, and check the DC voltages, or replace the DC Controller. |
| 57 SERVICE<br><br>57 MOTOR FAILURE<br><br>57.1 SERVICE | This message indicates that a main motor failure occurred. Power cycle the printer. If the error persists, first check the connections at the main motor and DC Controller, then replace the main motor to clear the error. See "57 (or 57.1) SERVICE message. |
| 58 SERVICE<br>58 FAN MOTOR FAILURE<br>57.2 SERVICE | This errors indicates the DC Controller detects an exhaust fan failure in either the printer or the optional duplexer. See the "58 (or 57.2) SERVICE" section for more information. |
| 61.[x] SERVICE<br>X=0 - 4 | Printer encountered a parity error when accessing the RAM memory SIMM in slot "X". If X=0, the faulty SIMM slot was not detected. Turn OFF the printer, then back ON. (Data stored in printer is lost.) If the error is still present, Turn OFF the printer and verify that the indicated SIMM is correctly installed. Turn ON the printer . If the error is still present, turn OFF the printer, and remove the SIMM board. Turn ON the printer. If the error message does not appear, the problem is on the SIMM board; if the error still appears, the problem is in the printer's internal memory. |
| 62.[x] SERVICE<br>x=0 - 5 | Printer identified a problem while checking its memory. "X" refers to the device the printer was checking when it encountered the error.<br><br>0: Internal Memory<br>1-4: SIMM Slot<br>5: Cartridge<br><br>If the printer contains a SIMM memory board, turn OFF the printer. (Data stored in printer is lost.) Verify that the SIMM is installed correctly, and turn ON the printer. If the error is still present, turn OFF the printer, and remove the SIMM board. Turn ON the printer. If the error message does not appear, the problem is on the SIMM board. |
| 63 SERVICE<br><br>63 NEEDS SERVICE | The printer found a problem in its internal RAM memory. Switch OFF the printer, and then switch ON. (You lose any data stored in the printer.) If the problem persists, replace the Formatter PCA. |

*Press Go on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| 64 SERVICE<br>64 PRINTER ERROR<br>65 SERVICE<br>67 SERVICE | The printer identified an internal service error. If this error appears, turn the printer OFF, and then back ON. If the problem persists, replace the Formatter PCA. |
| 68 ERROR<br>68 NVRAM ERROR | The printer detected an error in the nonvolatile memory (NVRAM). Press **Continue** *, then check your Control Panel settings. If the problem persists, replace the Formatter PCA. |
| 68 SERVICE<br><br>68 NVRAM FULL | The printer's nonvolatile memory is full because new feature sets were installed. Power the printer OFF, then back ON. If the problem persists reinitialize the NVRAM by pressing the **Item** ** key while powering on the printer. Reset the page count, cold reset paper size, display language, and all other applicable control panel settings. |
| 70 SERVICE<br>HP LJ 4+/4M+ Only | A firmware SIMM problem was identified. Remove or replace the firmware SIMM. |
| 71 SERVICE<br>HP LJ 4+/4M+ Only | A firmware SIMM problem was identified. Remove or replace the firmware SIMM. |
| 79 SERVICE [xxxx] | An internal controller error has occurred. Power the printer OFF, then back ON. If this error persists, replace the Formatter PCA. Remove third party memory, if installed. May also be caused by driver or application incompatibilities, or defective toner cartridge. |
| 80 SERVICE [xxxx] | The formatter PCA has been informed of an irrecoverable error by the MIO card. Power cycle the printer. If the error persists, replace the MIO card. |
| 81 SERVICE [xxx] | Formatter manufacturing error. Cold Reset the printer. If the problem persists, replace the Formatter PCA. |
| EE LOAD [envelope size]<br><br>ENVELOPE FEEDER [envelope size] | The printer received a request for an envelope size that is not loaded currently in the optional envelope feeder, or the feeder is empty. *Envelope size* may be: COM10, MONARCH, or DL, C5, B5, or ENVELOPE. Load the correct envelope size into the tray, or press **Continue** * to use the size of media installed in the feeder. |
| FE CARTRIDGE | An accessory cartridge was removed or replaced while the printer was on line. (This message appears even if the cartridge was not used.) Power cycle the printer to clear this message. Ensure that the printer is off line when the cartridge is removed or installed. If a font cartridge is not recognized, verify that it is installed correctly. |
| FI INSERT CART | An accessory cartridge was removed while the printer was in an error state. To clear this message, insert the cartridge, clear any error conditions, then remove the cartridge. |

*Press **Go** on the LJ5. **Press **Job Cancel** on the LJ5.

**Table 7-1** Printer Messages (continued)

| Message | Symptoms and Recommendations |
|---|---|
| FR REMOVE CART | An accessory cartridge was installed while the printer was in an error state. To clear this message, remove the cartridge, clear the pending error condition, then install the cartridge. |
| ME FEED<br>[envelope size]<br>MANUALLY FEED<br>[envelope size] | This message is displayed when there is a request for a manually fed envelope. *envelope size* may be: COM10, MONARCH, DL, C5, B5, or ENVELOPE. Insert the appropriate envelope size into the MP tray (Tray 1), and press **On Line*** to print. |
| MF FEED<br>[paper size]<br><br>MANUALLY FEED<br>[paper size] | This message is displayed when there is a request for manually fed media. *Paper size* may be: LETTER, LEGAL, EXEC, or A4. Insert the appropriate media size into the MP tray, and press **On Line*** to print, or press **Continue*** to feed from the Paper Cassette (Tray 2). |
| PC INSTALL<br><br>INSTALL TRAY 2 | The printer currently has the Lower Cassette or duplexer selected as the paper source, and has detected that the Paper Cassette (Tray 2), which serves as a paper guide for the Lower Cassette, is not installed. Install (reseat) the Paper Cassette. |
| xx LOAD [paper size or envelope size]<br><br>TRAY x LOAD [size]<br><br>ENVELOPE FEEDER [envelope size] | The printer received a request for a paper or envelope size not available in the printer. The xx is MP (Multi-Purpose), PC (Paper Cassette), or LC (Lower cassette). *Paper size* may be: LETTER, LEGAL, EXEC, or A4; for MP tray, *envelope sizes* may be COM10, MONARCH, DL, C5, or B5. Load the correct paper tray and/or media, or press **Continue*** to use the media in the installed tray(s). The printer continues automatically. If the problem persists, refer to page 7-13. |

*Press **Go** on the LJ5.

## Clearable Warnings

A clearable warning indicates a transient condition in the printer. The printer continues on line while the message is displayed in place of 00 READY. A clearable warning appears each time the printer alters resolution or page protection (this causes reconfiguration of memory), or aborts a job due to an invalid or uninstalled personality, or insufficient memory. Clear the message by pressing Shift + Continue (or Go for the LaserJet 5).

## Table 7-2 Clearable Warning Messages

| Message Displayed | Meaning |
|---|---|
| 01 IMAGE ADAPT<br><br>MEMORY LOW, PAGE SIMPLIFIED | The printer received a graphics print file that was too complex to print at the requested resolution. The printer automatically processed the file in the highest resolution possible with the memory installed. Add additional memory to print the file at full resolution. Check the printout for loss of data or print quality. |
| 02 INVALID PERS<br><br>REQUESTED LANGUAGE NOT AVAILABLE | The job was not printed because the requested personality, such as PostScript, was not installed. Install the language in which the files are sent, together with enough memory to support that language. |
| 03 JOB ABORTED<br>INSUFFICIENT MEMORY<br>JOB CLEARED | The printer was forced to abort the print job because there was not enough installed memory to support the printer language used. |
| 04 JOB 300/OFF<br>05 JOB 300/LTR<br>06 JOB 300/A4<br>07 JOB 300/LGL | The job was printed at 300 dpi with page protection set as specified in the message. To print the job as requested, install additional memory. |
| 08 JOB 600/OFF<br>09 JOB 600/LTR<br>00 JOB 600/A4 | The job was printed at 600 dpi with page protection set as specified in the message. To print the job as requested, install additional memory. |
| 0M MEM CNFIG N/A<br><br>MEMORY SETTINGS CHANGED | The printer did not have enough memory when switched on to support the previous settings for I/O buffering and /or Resource Saving, probably because you removed a memory SIMM, added a new personality SIMM, or added the optional duplex unit. |
| 0M CHK MEM CNFIG<br><br>MEMORY SETTINGS CHANGED | I/O Buffering and /or Resource Saving settings were altered when the printer was switched on because the printer did not have enough memory. This usually occurs after memory has been removed from the printer. (You can check settings by printing a self test.) |
| 0M [personality] MEM FULL<br><br>[personality] MEMORY FULL | The Resource Saving memory area for the specified personality is full. Press **CONTINUE** * to continue printing (some data will be lost). The current job will print, but some resources (downloaded fonts, etc.) may not be saved. If this error occurs frequently, you may need to adjust Resource Saving settings. |

*Press **Go** on the LJ5.

# Printer Message Troubleshooting Procedures

When the following procedures require removing and replacing an assembly or PCA, refer to the applicable section in Chapter 6 for instructions.

## Blank Display

**Table 7-3** Blank Display

| Checks | Action |
|---|---|
| Is the power on? | 1. Check the ON/OFF switch and verify the power is plugged in.<br>2. Press a Control Panel key to verify problem still exists. |
| Is the fan working? | 1. If the fan is working, check the cabling to the Control Panel. If the cabling is good, replace the Formatter first, then the Control Panel.<br>2. If the fan is NOT working, measure the DC voltage levels (refer to Table 7-39). If the voltage levels are good from the power supply to the DC Controller and the fan is not working, replace the DC Controller. If the voltage levels are not present at TB1, replace the DC Power Supply. |

## MP/PC/LC (Tray 1/2/3) LOAD Message

The conditions that result in `MP/PC/LC LOAD` or (`TRAY 1/2/3`) messages are:

- The absence of any input tray.
- The absence of media in either tray.
- The tray size switches may be defective and not recognize the presence of the paper tray. The tray is sensed as the tray-identifier tabs contact one or more of the three tray identifier microswitches.
- The Universal Tray paper size dial setting does not match the installed paper.

The `MP/PC/LC LOAD` message is also generated when the user or software requests a paper size other than that installed.

The Paper Sensing Arms are located in the paper input areas of the printer. During normal operation, the Paper Sensing Arm flags rest on the media installed in the paper tray. The Sensing Arm flags are attached to shafts. The opposite end of the shaft is a photointerrupter that rotates through the sensors on the Paper Control PCA. These sensors are:

- PS4 Paper out-MP tray.
- PS2 Paper out-PC tray.
- PS6 Paper out-Lower Cassette.
- PS7 Paper out-Envelope Feeder.

The presence of paper in the paper tray is sensed by the paper sensor arm. When paper is in the cassette, the sensor arm rests on top of the paper in the tray. At this point, the sensors are not blocked. When the tray is empty, the arm swings through its travel. The photointerrupter attached to the paper sensor arm shaft rotates and blocks the sensor diode.

**Table 7-4** "MP/PC/LC (Tray 1/2/3) LOAD" Message Checks

| Checks | Action |
|---|---|
| Is media present in the tray(s). | Install media. |
| Are the proper trays fully inserted in the printer? | Reseat the cassettes. Make sure each cassette is fully seated into the printer. Ensure that the Universal Paper tray selector knob setting matches the installed paper. |
| Does the Control Panel's or application's Paper size setting match the tray being used? | Correct the setting to match tray. |
| Is the expected tray size being recognized by the printer? | Ensure that the image is sized correctly (formatted) for the paper size selected. Proceed to the following cassette size switches functional check. Check switches 603/4/5 if feeding from the PC tray (Tray 1). Check switches 851/2/3 if feeding from the Lower Cassette. see Figures 7-14 and 7-15 for locations.) |
| Are any of the tray identifier tabs broken on either PC (Tray 1) or LC (Tray 2) paper tray? | Inspect the tray for damage. If damaged, replace the tray. |

### Cassette Size Switches (SW603, SW604, SW605) Functional Check

Before beginning this test, remove the Lower Cassette Base and the Envelope Feeder. Also, PS2 (PC or Tray 2 Paper Out sensor) must be engaged for this test to be performed reliably. Push PS2 up towards the rear of the printer with your hand.

1. Power ON the printer with the PC tray removed. Wait for the `PC LOAD XXX` message. Set `PAPER=LETTER` in the Printing Menu using the Control Panel.
2. With PS2 engaged, press and hold the lower and upper paper size switches (refer to Table 7-5). The display should read `00 READY`. If the display does not change, the switches are defective. Inspect the switch activating mechanism and/or replace the Paper Control PCA.
3. Repeat the test, this time setting the paper size to legal (`PAPER=LEGAL`) and pressing the top two switches. If the printer responds with `00 READY`, all three switches have been tested and verified.

**Note** The LaserJet 5 printer will require you to set the paper size, followed by a self test to generate the equivalent `TRAY 2 LOAD` message. Use the **Job Cancel** key between tests to cancel the Self Test printout.

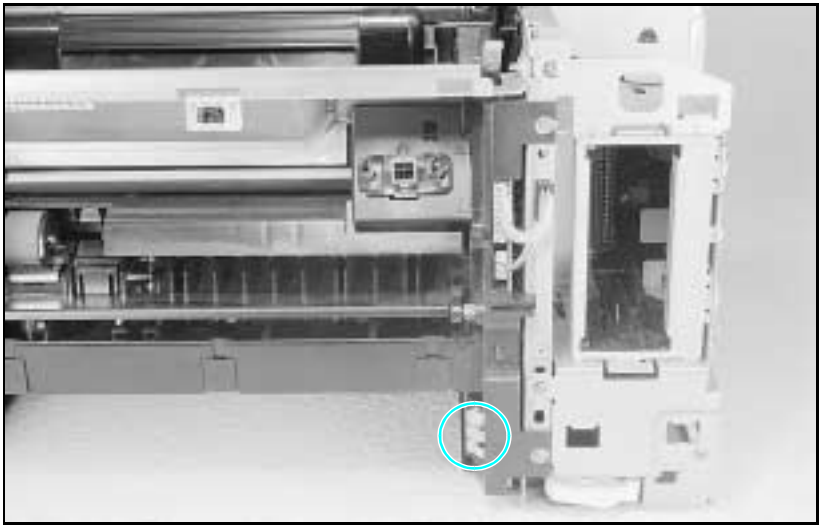

**Figure 7-1 PC Tray Size Sensing Microswitches Location**

**Table 7-5** Switch Logic for Cassette Size

| Cassette | Cassette Size Sensing Switch SW603/851 Upper | SW604/852 Middle | SW605/853 Lower |
|---|---|---|---|
| Legal | ON | ON | OFF |
| Letter | ON | OFF | ON |
| A4 | OFF | OFF | ON |
| Executive | OFF | ON | ON |
| No Cassette | OFF | OFF | OFF |

### Paper Size Sensing Lower Cassette

The operator must set the appropriate paper size for the Lower Cassette using a dial which, in turn, activates switches on the cassette base. This setting is sent to the DC Controller on the serial data bus (SLI). The printer posts a `41.3 SERVICE` error if the media is different from that selected with the switch.

To verify proper operation of the LC (Tray 3) switches, lock out the MP (Tray 1) and PC (Tray 2) trays (in the Config Menu) and perform the same test with Lower Cassette switches as was done for the PC tray (Tray 2) switches.

### PC Empty Sensor (PS2) Functional Check

1 Power on the printer with the PC tray (Tray 2) empty.
2 After the 05 SELF TEST and the 02 WARMING UP cycles, the PC LOAD LETTER (or A4) or TRAY 2 EMPTY message appears.
3 Add paper to the PC tray and re-install the tray.
4 The display should read 02 WARMING UP, then 00 READY. If the PC LOAD or TRAY 2 EMPTY message persists, replace PS2.

### PS4 Check (MP Tray Empty Sensor)

1 With the printer powered ON and 00 READY displayed, select the Config Menu from the Control Panel.
2 Configure the MP Tray (Tray 1) as a cassette (MP TRAY=CASS or TRAY 1=CASSETTE).
3 Lock out the remaining paper trays (LOCK= PC LC or LOCK TRAY= 2 3).
4 Remove any paper from the MP Tray (Tray 1). The printer should display an MP LOAD [paper size] message. For the LaserJet 5 printer, run a Self Test to generate the TRAY 1 LOAD message.
5 Insert paper into the MP Tray (Tray 1). If the MP LOAD (TRAY 1 LOAD) message persists (or if the load message never occurred), PS4 or the sensor flag is defective.

## 12 Printer Open Message

The `12 PRINTER OPEN` (or `CLOSE PRINTER COVER`) display tells the operator to close the printer's top cover. The DC Controller detects the Printer Open condition through the position of SW601, which is located on the Paper Feed Assembly PCA . A tab underneath the top cover Door engages SW601 through a slot in the Top Cover Assembly.

In addition to signaling that the top cover is open, SW601 enables the +24B VDC which controls the high voltage for the printing processes, and the AC Voltage for the Fuser Assembly.

**Table 7-6** 12 PRINTER OPEN Checks

| Checks | Action |
|---|---|
| Is the Top Cover Assembly open? | Ensure the Top Cover Assembly is firmly closed, and that the protrusion that engages the switch actuator is not broken. |
| With the top cover open, check that the switch actuator does engage the switch. | Use a slim object to manually engage SW601. Listen for a definite "click" as the switch is engaged (see Figures 7-2 and 7-14). |
| Has the Paper Control PCA on the Paper Feed Assembly been replaced? | SW601 has an actuator that can be deleted during reassembly. Ensure that this actuator is installed correctly. |
| Is the DC Controller PCA defective? | Measure the 24 VDC on J201, pins 8 and 9 on the DC Controller (see Figures 7-16 and 7-17 for locations). If this 24 volts toggles as SW601 is activated, replace the DC Controller. If it does not, replace the Paper Control PCA or the cable. Also check J201-6 (DOPEN). This voltage should be 5 VDC when the printer is open, and 0 when the printer is closed. If not, replace the DC Controller PCA. |

**SW601 Functional Check**

1. Open the Top Cover Assembly.
2. The message `12 PRINTER OPEN` (or `CLOSE PRINTER COVER`) should appear.
3. Close the top cover. The `02 WARMING UP` message should appear.
4. If the messages do not occur, check the switch actuator (see Figure 7-2, callout 1) on the top cover, and check that the plunger that covers the switch is in place (see also Figure 7-14 for switch locations).
5. Replace the Paper Control PCA.

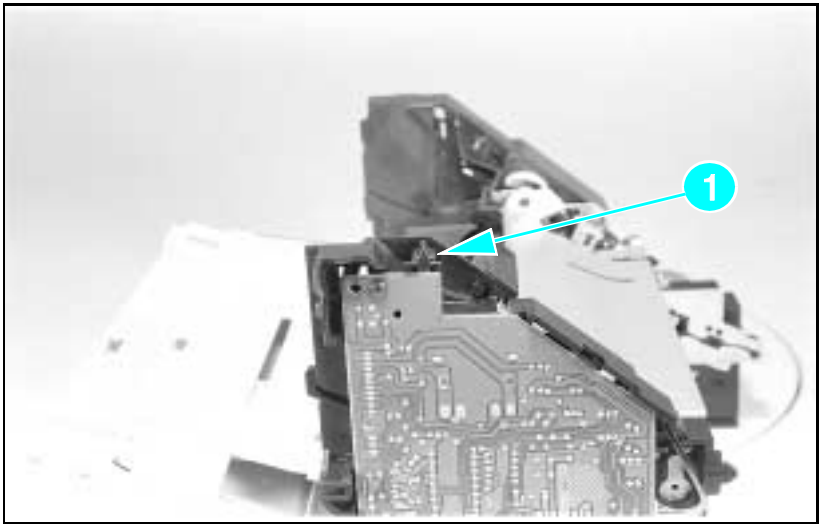


**Figure 7-2 Location of the Top Cover Closed (SW601) Actuator**

## 13 PAPER JAM Message

Paper jams occur when paper fails to arrive at or clear the paper path sensors in the allotted time. Paper movement is monitored primarily by two paper sensors. These are described below and illustrated in Figure 7-3).

**1** PS1, the Input/Registration Sensor, located in the Paper Feed Assembly.
**2** PS3, Exit Sensor, monitors paper in the Fuser Assembly.

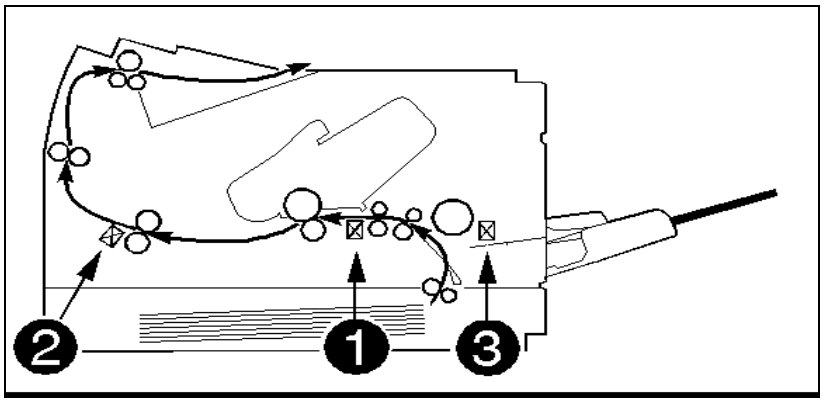


**Figure 7-3 PS1 and PS3 (Paper Path Sensors) & PS5 Paper End Sensor**

When troubleshooting paper jams, the door associated with the sensor must be opened and closed to clear the jam message. For instance, if PS3 (Exit Sensor) detected the paper jam, and the jam was cleared through a method other than opening the rear door, the message remains in the display until the rear door is opened and closed. Likewise, the top cover must be opened before a jam detected by PS1 is cleared.

The DC Controller monitors these sensors, and detects both the leading and trailing edge of the paper to verify that the paper clears the sensors in the allotted time. If the paper does not arrive at, or clear the sensors in the allotted time, the DC Controller senses a paper jam. The paper jam information is transferred to the Formatter PCA, which displays the `13 PAPER JAM` message.

Note also that if PS5 (MP Tray or Tray 1) Paper End Sensor on the Sensor PCA is bad (Figure 7-3, item 3), a paper jam will be reported when paper is fed from the MP Tray (or Tray 1).

**Table 7-7** Paper Jam Troubleshooting Checklist

| Jam Location | Checks and Action Required |
|---|---|
| Input Area Jams (Sensed by PS1.) | 1. Check that the Transfer Roller is fully seated and shows no sign of wear.<br>2. Check that the Toner Cartridge is fully seated.<br>3. Check that the cassettes are not overfull and the media is loaded correctly.<br>4. Ensure that the media meets specs. (media is not too smooth or rough), and it has been stored properly.<br>5. Ensure that the paper tray is fully seated (especially if printing from the Lower Cassette).<br>6. Ensure that the spring force of the Lower Cassette is set correctly. |
| Registration Area Jams (Sensed by PS1.) | 1. If paper is damaged at the Registration Sensor (PS1), check that the Transfer Charge Roller is properly seated. |
| Lower Cassette Paper Jams (Sensed by PS1.) | 1. The LC Tray (Tray 3) is not fully seated into the printer. Seat the LC Tray firmly into the printer.<br>2. The Lower Cassette feed pressure (spring force) adjustment is incorrect. Set the spring force as shown in Chapter 3. |
| Fuser Assembly Jams (Sensed by PS3.) | 1. Check that the Fuser Pressure Roller Levers are down (LJ4 and 4 Plus Only).<br>2. Check that the Exit Sensor Arm (PS3) is free throughout its travel and that the Exit Sensor Arm is installed correctly. |
| False Paper Jams<br><br>Paper Jam occurs when the last sheet of paper is fed from the tray. | 1. PS1, PS3, or PS5 are damaged or mechanically broken.<br>2. The sensor wires are damaged or disconnected.<br>3. The rear door is open.<br>4. Paper out sensors in the paper tray or envelope feeder may be defective, or the sensor flags may be broken or missing. PS2 is the sensor for the PC Tray (Tray 2), PS4 is the sensor for the MP Tray (Tray 1), PS6 is the sensor for the LC Tray (Tray 3), and PS7 is the sensor for the Envelope Feeder. |

**PS1 (Input/Registration Sensor) Check**

1 Power ON the printer *with the top cover open*. Wait for the `12 PRINTER OPEN` (or `CLOSE PRINTER COVER`) message.
2 Engage PS1 by taping it down.
  **a** For the LaserJet 5, install the toner cartridge.
3 Close the top cover. The `02 WARMING UP` message should display.
4 After the fuser warms up, the main motor should turn on.
5 The `13 PAPER JAM` message appears if the sensor is working correctly.
6 If the `13 PAPER JAM` message does not appear, check that PS1 was fully engaged, then replace PS1.
7 Remove the tape from PS1, install the Toner Cartridge and close the top cover.
8 The display should change from `02 WARMING UP` to `00 READY`. If the `13 PAPER JAM` message persists, replace PS1.

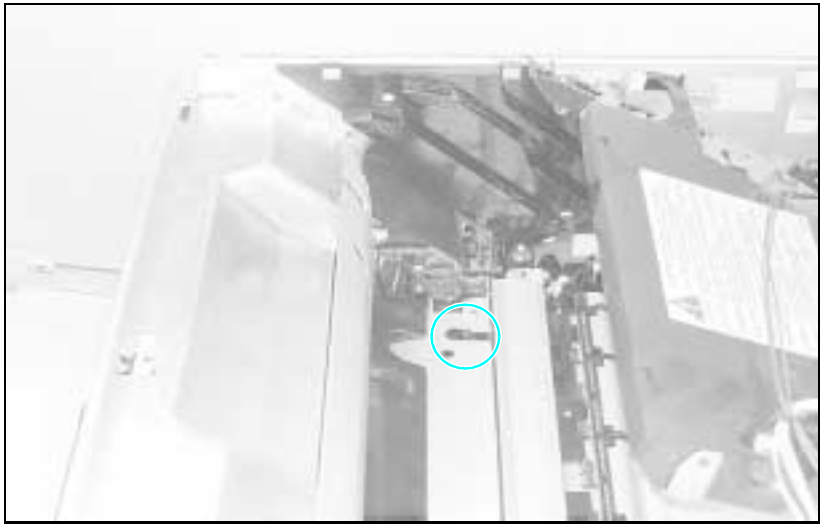

Figure 7-4 PS1 Input/Registration Sensor

### PS3 (Exit Sensor) Check

1 Open the rear door (cover) of the printer.
2 The display should read `13 PAPER JAM` (or `REMOVE PAPER JAM`) immediately after the door is opened.
3 Close the rear cover. The display should change from `02 WARMING UP` to `00 READY`.
   a If the `00 READY` message does not appear, check that the rear door is not damaged, and the the door closes and latches properly.
   b If the `PAPER JAM` message does not appear, replace PS3.

### Pickup Motor Functional Test (M2)

There is not a good method with which to access the test points around the Pickup Motor (M2) circuit. Therefore, when troubleshooting Pickup Motor failures, perform the following in the order listed (see Figures 7-11 and 7-12 for component location).

1 Reseat J601 and J602 on the Paper Control PCA.
2 Reseat J201 on the DC Controller. Reseat J703 on the Sensor PCA.
3 Verify that the Paper Control PCA and the Sensor PCA are firmly seated into one another.
4 Replace the Pickup Motor.
5 Replace the Paper Control PCA.
6 Replace the Sensor PCA.

### Lower Cassette Functional Check

When troubleshooting a Lower Cassette failure, always prove the failure by removing the Lower Cassette from the printer. Next, test the printer's ability to move and print media satisfactorily without the Lower Cassette installed.

The Lower Cassette is a field-serviceable item. The procedures for removing and replacing the Lower Cassette components are in Chapter 6. Replacement parts for the Lower Cassette Assembly are listed in Chapter 8.

After the failure has been associated with the Lower Cassette Assembly, perform the following in the order given. Test the repair after each replacement.

**1** Reseat all connectors in Lower Cassette.
**2** Replace the Lower Cassette Pickup Motor.
**3** Replace the Paper Control PCA.
**4** Replace the DC Controller.

## 14 NO EP CART Message

The printer detects the presence of the Toner Cartridge and the level of toner present in the cartridge through the condition of the ANTIN signal. The ANTIN signal becomes part of the serial data stream used to communicate with the DC Controller (see Figure 7-5 for cartridge components). Troubleshoot the `14 NO EP CART` (or INSTALL TONER CARTRIDGE) message as follows:

1. Reseat the Toner Cartridge. Try a new or known good Toner Cartridge.
2. Check the High Voltage Contacts for damage. If the contacts are dirty or damaged, clean the contacts after the repair.
3. Replace the High Voltage Power Supply.
4. Check and reseat the HVPS cable.
5. Replace the DC Controller.

## 16 Toner Low Message

The `TONER LOW` message results as the level of toner in the cartridge cavity falls past the minimum level. The level is sensed by a mechanism similar to an antenna, which detects the AC Developer Bias Voltage applied to the developer mixture. If the `TONER LOW` message cannot be cleared by shaking or replacing the Toner Cartridge, perform the steps listed for troubleshooting the `14 NO EP CART` message.

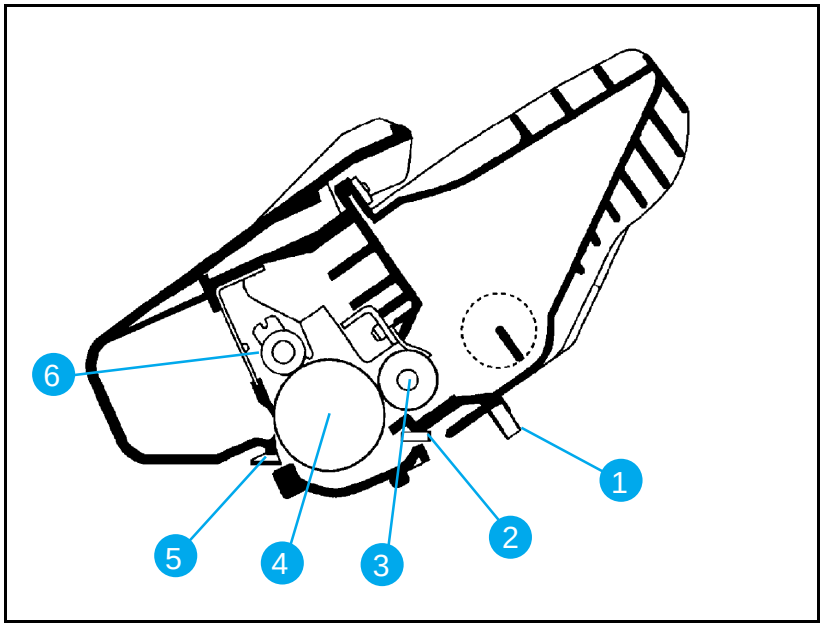


**Figure 7-5 Toner Cartridge Components**

**Table 7-8** Toner Cartridge Components

| Callout | Assembly |
|---|---|
| 1 | Toner Low Voltage Contact |
| 2 | Developer Roller High Voltage Contact |
| 3 | Developer Roller |
| 4 | Photoconductive Drum |
| 5 | Charge Roller High Voltage Contact |
| 6 | Charge Roller |

## 41.X ERROR Message

A 41.X ERROR (misprint) indicates that a *temporary* malfunction has occurred with the print engine (NOT a Formatter error). Occasional occurrences of this message can be expected. However, persistent 41 ERROR messages indicate a problem requiring attention.

The 41.X ERROR is usually accompanied by a blank, or partially printed page. Pressing the Continue (or Go) key re-prints the page, and continues the print job.

A 41 ERROR occurs due to the following conditions:

- Incorrect Universal Tray Switch setting. Set the Universal Tray and the Lower Cassette Tray paper size as shown in Chapter 3.
- Wrong size paper in tray. Check that the Universal Tray, and/or the Lower Cassette settings match the installed paper.
- An unstable or temporary loss of the Beam Detect pulse. This problem normally is accompanied by a partially printed page, often with thin horizontal black lines, deformed characters, or solid black areas. Loss of the Beam Detect pulse for more than 2 seconds results in a 51 ERROR condition.
- Paper reaching the Input Paper Sensor (PS1) before it is expected. This is accompanied by a blank page. This normally is due to paper feed problems.

  Proceed as directed in the following table.

**Table 7-9** 41.X ERROR Checks

| Error Message | Recommended Action |
|---|---|
| 41.1 ERROR<br>Noisy Vertical Sync (VS) | Reseat all connectors on the DC Controller, the Laser Drive PCA, the Scanner Connector and the Beam Detect Connector. |
| 41.2 ERROR<br>Beam Detect (BD) weak or unstable. | Reseat all connectors on the DC Controller. Also check the Laser Scanning Assembly connections. |
| 41.3 ERROR<br>Paper Multifeed | 1. Incorrect size selection on the cassette.<br>2. One of the cassettes is overfull. Remove the extra paper from the overfull cassette.<br>3. Check the paper for edge damage. Improperly cut edges can lock together causing multi-feeds.<br>4. Check that the pickup rollers and separation pad are not worn. Replace the rollers and pad as a set if necessary. Ensure that the corners of the paper are tucked in the tray's retainers.<br>5. Check the paper tension adjustment on the optional Lower Cassette, if attached. Refer to procedure in Chapter 3. |
| 41.4 ERROR<br>Vertical Sync Late (VS) Signal | Reseat the DC Controller and Formatter PCA Connections. |
| 41.5 ERROR<br>Undetermined Cause | Reseat the DC Controller and Formatter PCA connections. |

See Figures 7-11 through 7-17 for connector locations.

## 50 SERVICE Error - Fuser Malfunction

**Warning** The Fuser Assembly is HOT. Allow the assembly time to cool before servicing.

The purpose of the fusing system is to maintain a constant temperature on the fuser roller. A high intensity fusing lamp, located inside the fuser roller, provides the high temperature required for the fusing process. While the printer is in standby mode, a temperature of approximately 172° C is maintained on the fuser roller. While the printer is in printing mode, a temperature of around 183° C is maintained.

The main components of the Fuser Assembly are the fusing lamp and its associated fusing and pressure rollers, a thermistor, thermoprotector, and the AC controller/safety circuitry in the AC Power Supply. The fusing lamp is a specially designed 460 watt (220V), or 500 watt (115V) halogen lamp that operates at line voltage. The thermistor is a resistor whose value changes with temperature. At room temperature the resistance value of the thermistor should be between 180k ohms and 280k ohms.The thermoprotector is a switch designed for over-temperature protection, and opens when the temperature reaches 230° C. The thermoprotector will not reset when the fuser cools. It may be necessary to replace the thermoprotector or fuser assembly if the thermoprotector opens.

The following conditions result in a fusing error:

1 Unable to maintain a temperature above approximately 180° C.
2 A temperature above 230° C.
3 A condition wherein a temperature of 165° C is NOT reached within 90 seconds after power-up.

**Note** If a `50 SERVICE` error message is displayed, turn the printer OFF for at least 10 minutes. Failure to wait the full 10 minutes before turning the printer ON results in a continuation of the error message and the shutting off of the fuser lamp current during this time, though the source of the error may have already been resolved.

**Table 7-10** 50 SERVICE Fuser Malfunction Checks

| Checks | Action |
|---|---|
| Is the Fuser Assembly correctly seated? | Reseat the Fuser Assembly. Allow adequate time for the error message to clear (10 minutes) and turn the printer ON. |
| Is the Fuser Bulb/ Thermoswitch open? | The fuser bulb and thermoswitch are wired in series. To check if one or the other is defective, perform the following:<br>1. Remove the Fuser Assembly from the printer.<br>2. Use an ohmmeter and measure the continuity between pins (see Figure 7-6, callout 1). It should read about 2 ohms (about 4 ohms for the 220 volt fuser). If an open condition is detected, either the fusing bulb or the thermoswitch is defective. Replace the defective component (refer to Chapter 6) or replace the complete Fuser Assembly. |
| Is the Thermistor defective? | 1. Remove the Fuser Assembly and let it cool to room temperature.<br>2. Use an ohmmeter and measure the resistance between pins (see Figure 7-6, callout 2) It should read about 220 K ohms +/- 40 K ohms at ambient room temperature. If the thermistor is either open or shorted, replace the thermistor (refer to Chapter 6) or the complete Fuser Assembly. |
| Does the error persist? | 1. Verify all cabling is correct.<br>2. Replace the following components in the order given:<br>Power Supply Assembly<br>DC Controller PCA |

See Figure 7-11 for Fuser Assembly location and Chapter 6 for removal and replacement, as necessary.

**Note** The `50 SERVICE` error message can be cleared immediately by shorting the C202 leads on the HP LaserJet 4/4M (or the C205 leads on the HP LaserJet 4 Plus/4M Plus/5/5M/5N) on the DC Controller. Remove the Formatter PCA to access the DC Controller as shown in Chapter 6.

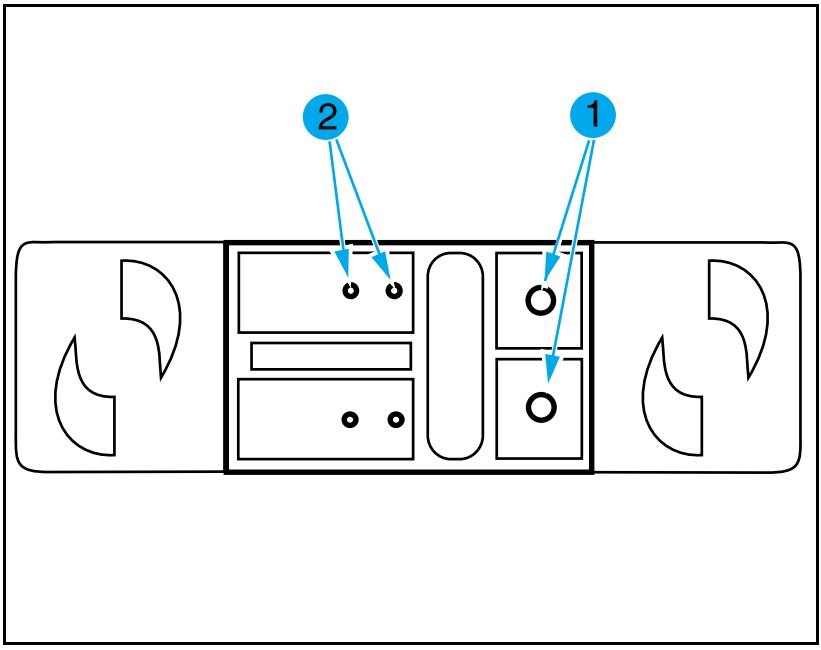


**Figure 7-6 Fuser Assembly Connector**

## 51 ERROR Message

The `51 ERROR`, and the `41.2 ERROR` are caused by Beam Detect failures. If the beam detect signal is lost for more than 2 seconds the error is posted as a `51 ERROR`. The `41.2 ERROR` can be cleared by pressing **Continue** (or **Go**). The `51 ERROR` may be cleared by power cycling the printer.

**Table 7-11 51 ERROR Beam Detect Checks**

| Checks | Action |
|---|---|
| 1. Are all connectors on the DC Controller properly seated? | Inspect connectors and wiring. Reseat or replace cables if necessary. |
| 2. Is the Laser/Scanner Assembly Defective? | A defective Laser/Scanner Assembly can cause a `51 ERROR` by spinning the scanning mirror at the wrong speed. Replace the Laser/Scanner Assembly. |
| 3. Is the DC Controller Defective? | Replace the DC Controller. |
| 4. Has the printer been moved from a cold to a warm room? | Allow the printer to stand 6 hours until any condensation has dissipated. |

## 52 ERROR Scanner Malfunction

The scanner motor is a flat, brushless, DC motor. Motor operation is completely controlled by the DC Controller.

The scanner motor is enabled when the printer is powered-up (during the printer's power-on self test), or whenever the PRINT command is received by the Formatter PCA. The scanner motor makes a distinctive sound when starting. The sound can be described as a "variable pitch whirring" sound. Listen for the sound of the scanner motor when troubleshooting the `52 ERROR`.

### Laser/Scanner Assembly Functional Checks

Initiate a Self Test. As the test begins, listen for the sound of the scanner motor. If the motor cannot be heard, perform the following in the order given:

1. Check the Laser/Scanner and the Power Supply cables. Replace if necessary.
2. Replace the Laser/Scanner Assembly.
3. Replace the DC Controller.

## 57 (or 57.1) SERVICE Message (Main Motor Failure)

The `57 SERVICE` indicates that the DC Controller PCA detected a general motor failure. The Main Motor drives all moving components in the printing process. The Main Motor is a 4-phase, DC servo motor controlled by the DC Controller PCA.

The formatter detects a Main Motor failure when:

- The Main Motor does not come up to speed within one second of receiving drive voltage.
- The Main Motor deviates from the correct speed for one second after reaching the correct speed.

### Main Motor Functional Checks

- Inspect the gear train for debris that would block the free operation of the gears.
- Check the gears in the Toner Cartridge for wear and binding.
- Reseat J211 (or J214 on the HP LaserJet 4 Plus/4M Plus) on the DC Controller PCA, and the main connector on the Main Motor Assembly. Refer to Figures 7-16 and 7-17 for the DC Controller PCA connector locations.
- If the problem persists, check that the +24B Voltage is present on the DC Controller. If the voltage is not present, replace the DC Controller. If the voltage is present, and the motor does not rotate, replace the Main Motor Assembly (see Figure 7-11 for location).

## 58 (or 57.2) SERVICE (Fan Failure)

The `58 SERVICE` indicates that the DC Controller detected a failure in the Exhaust Fan (FM1) in the printer or the optional duplexer. When troubleshooting this problem, perform the following steps in the order given.

1 Check that the fan is mounted correctly in its shroud.
2 Check that the fan blades are not blocked.
3 Check that the Cooling Fan connector is firmly seated on the DC Controller (see Figure 7-16 or Figure 7-17 for location).

If the above checks are satisfactory, replace the fan.

**Note** Verify the direction of air flow. Air should blow out of the printer.

# Image Defect Summary

The quality of the printer's output is subject to the judgment of the user. This section of the manual helps you define print quality defects, and understand what factors affect print quality.

The print samples shown in the following figures illustrate some print quality defects. Keep copies of print quality defects encountered in the field with an explanation of their causes for future reference.

The image defects listed below are covered in the following tables. (For major assembly, connector, and switch locations, see Figures 7-11 through 7-18 later in this chapter.)

- Black Pages.
- Any Faint Print Condition
- Faulty Registration
- Vertical White Streaks.
- Right-hand Image Missing.
- Small Print Voids
- Random Horizontal Black Lines
- Repetitive Defects.
- Smeared Print/Improper Fusing.
- Distorted Print.
- Black Pages with Horizontal White Strips.
- Image Skew.
- Improperly Sized Image.
- Vertical Dark Streaks.
- Large Print Voids.
- Background Scatter.
- White or Blank Pages.

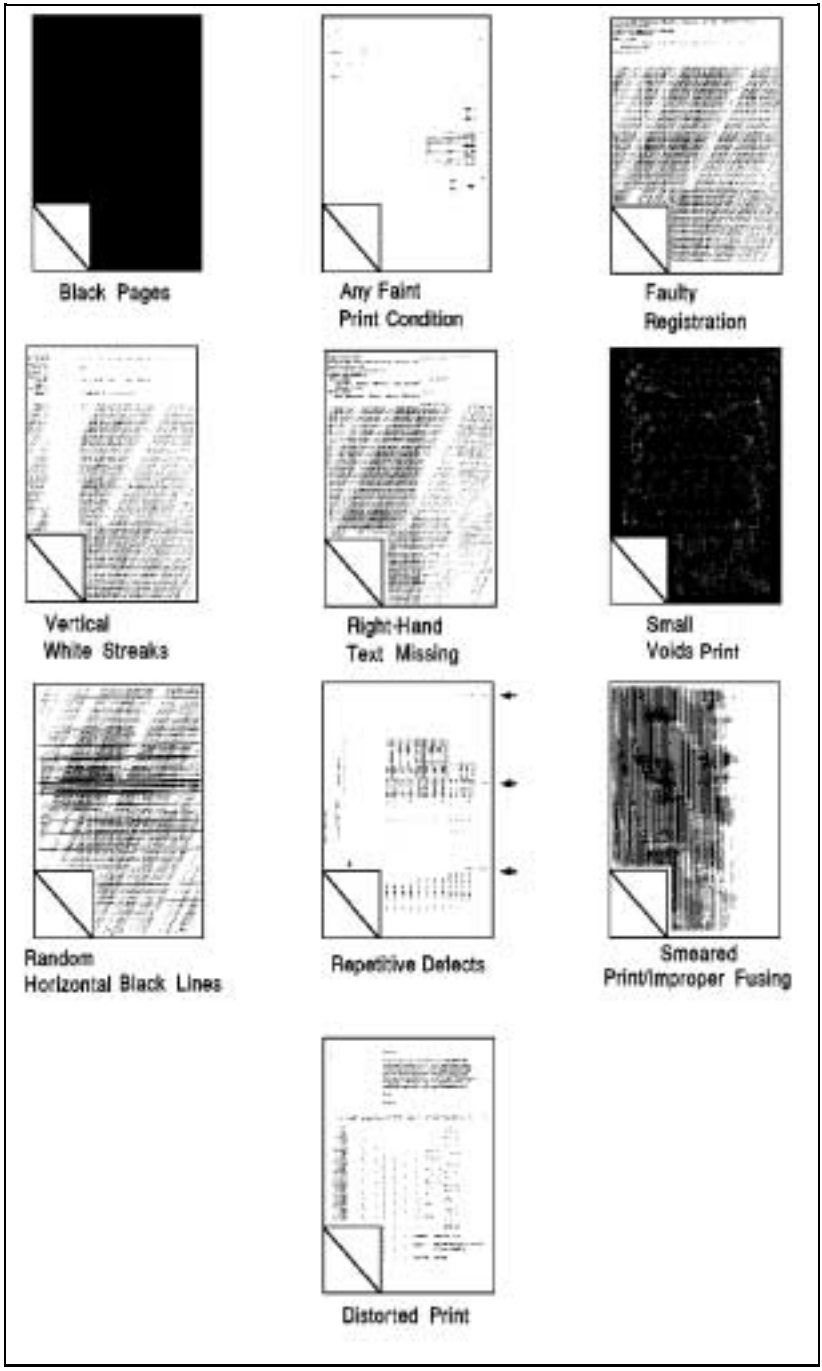


**Figure 7-7 Image Defect Summary**

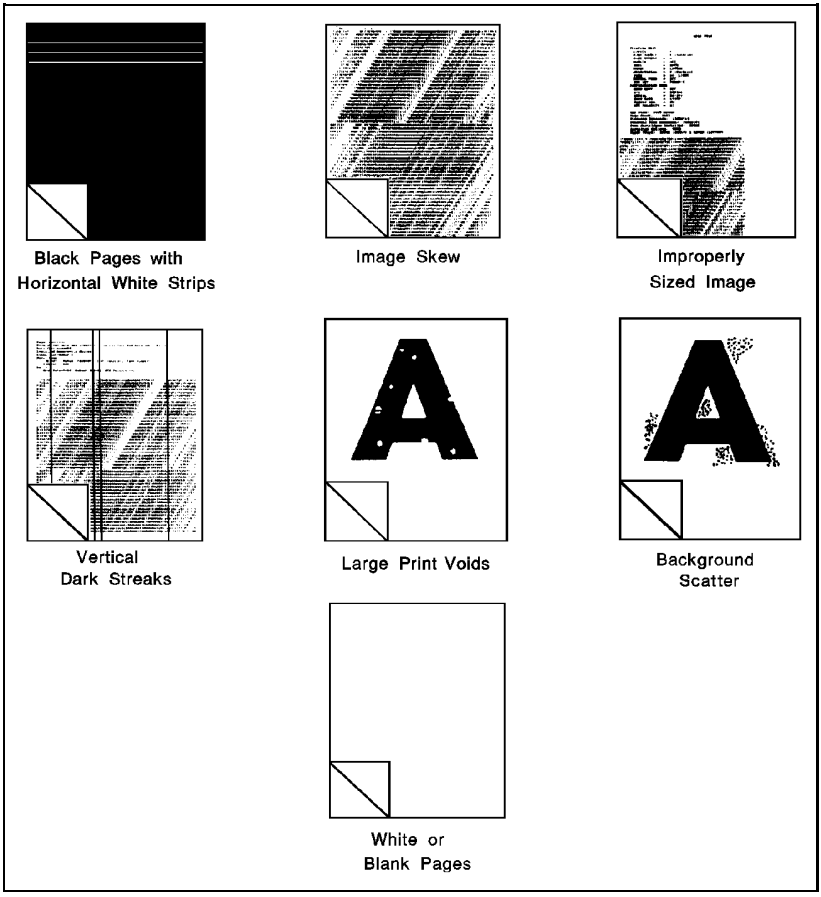


**Figure 7-8 Image Defect Summary**

## Table 7-12 Black Pages

| Possible Cause | Action |
|---|---|
| The HVPS connections are dirty. | Clean the HVPS terminals (see Figure 7-18 for layout). |
| The HVPS is installed improperly. If the HVPS has been removed and replaced, it may not be seated properly. | Remove the HVPS, and check the connectors for damage. Reseat the HVPS, being certain to fully seat the connectors. |
| Bad Primary Charging Roller. | Replace the Toner Cartridge. |
| The HVPS is defective. | Replace the HVPS. |
| DC Controller PCA. The laser drive circuitry is damaged so that the laser is always on. | Replace the DC Controller PCA, followed by the Formatter PCA if required. |

## Table 7-13 Any Faint Print Condition

| Possible Cause | Action |
|---|---|
| Printer set to Economode. | Change driver and/or Control Panel settings to ECONOMODE=OFF. |
| Toner Cartridge. | Replace the Toner Cartridge. |
| Print density set improperly. The higher the print density setting, the more toner transferred to the drum. | Set the print density to a darker level. Replace the high voltage power supply if this has no effect. |
| The paper finish, conductivity, or moisture content may not be suitable for the electro-photographic printing process. | Try a known good source of paper from a freshly opened package. Refer to the HP LaserJet Family Paper Specifications Guide for media specifications. |
| The transfer roller may be defective. | Replace or reseat the roller. |
| Weak or no developer bias. If inadequate, or no developer bias is produced, toner is not attracted to the image written on the drum. | Adjust the print density setting as shown in Chapter 3. |

## Table 7-14 Faulty Registration

| Possible Cause | Action |
|---|---|
| Paper. The surface of the paper may be too smooth for the pickup roller to move the paper through the paper path. | Change paper. Try a brand of paper known to be good. |
| Worn Pickup Roller and Separation Pad. | If the Paper Pickup Roller, or the Separation Pad are sufficiently worn, the leading edge of the paper may not reach the registration assembly in time. Replace the Pickup Roller and Separation Pad together. |
| PS1 faulty. If the Input/Registration sensor (PS1) is broken, it can not sense the presence of paper at the registration point. | Replace the Input/Registration Sensor. |
| Drive Gears. If any gear within the gear drive train becomes excessively worn or dirty, erratic paper movement results, causing image misregistration. | Examine the gears along the paper path for wear and contamination. Clean and inspect the gears. Replace any broken or defective gears. |
| Paper Tray. The paper tray may be preventing the paper from moving through the printer. | Verify that the tray is loaded correctly. Verify that the paper tray is seated fully into the printer. If possible, exchange tray with another printer to see if the problem is associated with the tray. Note the HP LaserJet 4/4M tray is NOT interchangeable with the HP LaserJet 4 Plus/4M Plus tray. The LJ5 paper trays are not compatible with the LJ4 or LJ4+. Replace the paper tray. |
| DC Controller replaced. | If the DC Controller was replaced, adjust VR202 as shown in Chapter 6. |
| Paper Input Assembly replaced. | The HP LaserJet 4/4M Paper Input Assembly is NOT compatible with the HP LaserJet 4 Plus/4M Plus. The LJ5 Paper Input Assembly is not compatible with the LJ4 or LJ4+ Input Assemblies. Installing a non-compatible Input Assembly results in paper input registration problems. |

### Table 7-15 Right-Hand Image Missing

| Possible Cause | Action |
|---|---|
| No toner available for print. | Shake/replace the EP Toner Cartridge. |
| Laser shutter may be blocking the beam | Ensure that the mechanism that lifts the shutter is functional, for example, the shutter doesn't stick in its travel, and is lifted evenly. |

### Table 7-16 Small Print Voids

| Possible Cause | Action |
|---|---|
| Small voids on black, or near-black printed images may be caused by imbedded toner on the electro-photographic drum. Cartridges that are run for long periods of time in high temperature and humidity conditions may develop this problem. | Replace the EP Toner Cartridge. If the printer is installed in a hot or humid location, tell the customer to move the printer to a better location. |

### Table 7-17 Random Horizontal Black Lines

| Possible Cause | Action |
|---|---|
| Laser/Scanning Assembly misaligned or damaged. | Replace the Laser/Scanner Assembly. |
| DC Controller PCA | Replace the DC Controller PCA. |

### Table 7-18 Vertical White Streaks

| Possible Cause | Action |
|---|---|
| 1.No toner is available for print, or the toner level is low. | Shake the EP Toner Cartridge, replace the cartridge if the problem persists. |
| 2.The lenses within the Laser/Scanning Assembly may be contaminated, blocking (or diffusing) the laser light. | Replace the Laser/Scanning Assembly. |

**Table 7-19** Repetitive Defects

| Possible Cause | Action |
|---|---|
| Toner Cartridge. The circumference of the photoconductive drum is 3.75 inches (94mm). The circumference of the developer roller is 2 inches (51mm). If a defect appears in the print image at these intervals, assume the defect is associated with the Toner Cartridge. | Replace the Toner Cartridge. |
| Fuser Assembly. The Fuser Roller's circumference is approximately 2.5 inches (63mm) for the LJ4, and 3-1/8 (79mm) for the LJ4+/5. If a defect appears at this interval, assume the defect is associated with the Fuser Assembly. | Clean the Fuser Assembly rollers. Replace the assembly if necessary. |
| Dirty Roller. Any dirty roller along the paper path may result in a pattern of repetitive print image defects. | Examine and clean rollers along the paper path. |

For further information on interval dimensions, refer to the Repetitive Defect Ruler, Figure 7-19.

## Table 7-20 Smeared Print/Improper Fusing

| Possible Cause | Action |
|---|---|
| Fuser levers not in place. (All LJ4, some LJ4+, N/A on LJ5) | The Fuser Assembly has shipping levers that must be lowered during the setup process. See Chapter 3 for instruction on how to lower the fusing levers. |
| Media. The media may not be acceptable for laser printing. Heavy paper stock is a common cause of smeared print and improper fusing. | Verify that the media meets specifications as shown in the HP LaserJet Family Paper Specifications Guide. |
| Dirty Fuser Assembly. The print smears if the Fuser Assembly is dirty. | Replace the Fuser Assembly and clean the printer. |
| Bent Static Teeth. If the static teeth are defective, the print could smear prior to the paper entering the Fuser Assembly. | If the teeth are bent or defective, replace the Static Teeth Assembly. |
| Worn Gears. If the drum and paper are not moving at the same speed the characters may smudge. | Replace the Toner Cartridge. |
| Foreign object in paper path. Something is smearing the unfused toner image on the surface of the paper. | Remove any foreign material. Try a new Toner Cartridge. |
| Orange Packing Spacers not removed. Some HP LaserJet 4 only. | Remove Orange Packing Spacers. |

## Table 7-21 Distorted Print

| Possible Cause | Action |
|---|---|
| Paper Path. If the paper does not move at a uniform speed, the print image will be affected. Characters that are either too tall or too short (in the direction of paper motion), are usually a result of drive mechanism problem. | Examine the paper transport rollers along the paper path for wear. Replace if excessive wear exists. Inspect and replace the Toner Cartridge, Drive Gear Assembly, Main Motor, or Fuser Assembly as necessary. |
| Laser/Scanning Assembly. Wavy, irregular-shaped characters, or irregular line margins in the scan direction of printing are usually a result of a defective Laser/Scanning Assembly. | Replace the Laser/Scanning Assembly. |

**Table 7-22** Black Pages with Horizontal White Strips

| Possible Cause | Action |
|---|---|
| Laser/Scanning Assembly or DC Controller PCA. | Replace the Laser/Scanning Assembly followed by the DC Controller PCA, if necessary (see Figure 7-12 for locations). |

**Table 7-23** Image Skew

| Possible Cause | Action |
|---|---|
| Input/Registration Sensor (PS1). The Paper Pickup Roller positions the leading edge of the paper at the Input/Registration Sensor (PS1). If this sensor is defective it may not sense the presence of the paper reliably (on time). | Replace the Input/Registration Sensor. Skew tolerance for the printer is 1.5mm over 260mm page length. |
| Drive Gears. If any gear within the gear drive train becomes excessively worn, or is excessively dirty, erratic paper movement would result, leading to image misregistration. | Closely examine the gears along the paper path for wear and contamination. Clean and inspect the gears. Replace any defective gear. |
| Paper Tray. The paper tray may be preventing the paper from freely moving through the printer. | Verify that the tray is loaded correctly. Verify that the paper tray is seated fully into the printer. Switch trays to verify that the problem follows the tray. Replace the paper tray. |
| Paper. The surface of the paper may be too smooth for the pickup roller to move the paper through the paper path. | Change paper. Try paper known to be good. |
| Paper too heavy? | See *Paper Specifications* in Chapter 2. |

**Table 7-24** Improperly Sized Image

| Possible Cause | Action |
|---|---|
| PC tray Microswitches. The paper tray microswitches indicate the paper size of the installed tray. This information is used to format the print image to the size of the paper installed in the tray. If the paper tray microswitches are defective, the image is formatted incorrectly. | Perform the “Cassette Size Switches (SW603, SW604, SW605) Functional Check” on page 7-15. Ensure that the correct envelope size is selected if appropriate. |
| PS 5 is defective. PS 5 senses the trailing edge of the media being fed from the MP tray. | If improperly sized images result from printing from the MP tray, check that PS 5 is functioning correctly mechanically and electrically. This feature allows odd-sized media to be printed with the MP tray. Troubleshoot PS 5 as shown in the following procedure. |
| MP Paper Size is not set correctly. | Use the MP Paper Size Button on the Front Panel to correctly configure paper size for the MP Tray. |

### PS5 Check (MP Tray Paper End Sensor) Functional Test

1. Make a test sheet by cutting a notch in the trailing edge of a sheet of paper as shown in Figure 7-9.
2. Perform the set up procedures listed for the PS4 check (MP Tray Empty Sensor) on page 7-17, and put the test sheet into the MP tray when the display reads `XX LOAD LEGAL`.
3. The self test print should stop 2 to 5 mm above the notch (see Figure 7-9).
4. Print that extends into cut out area indicates that the sensor PS5 is not free in its travel or is defective. Ensure that the sensor lever is free throughout its entire range of travel. If not, replace the lever or the sensor itself.

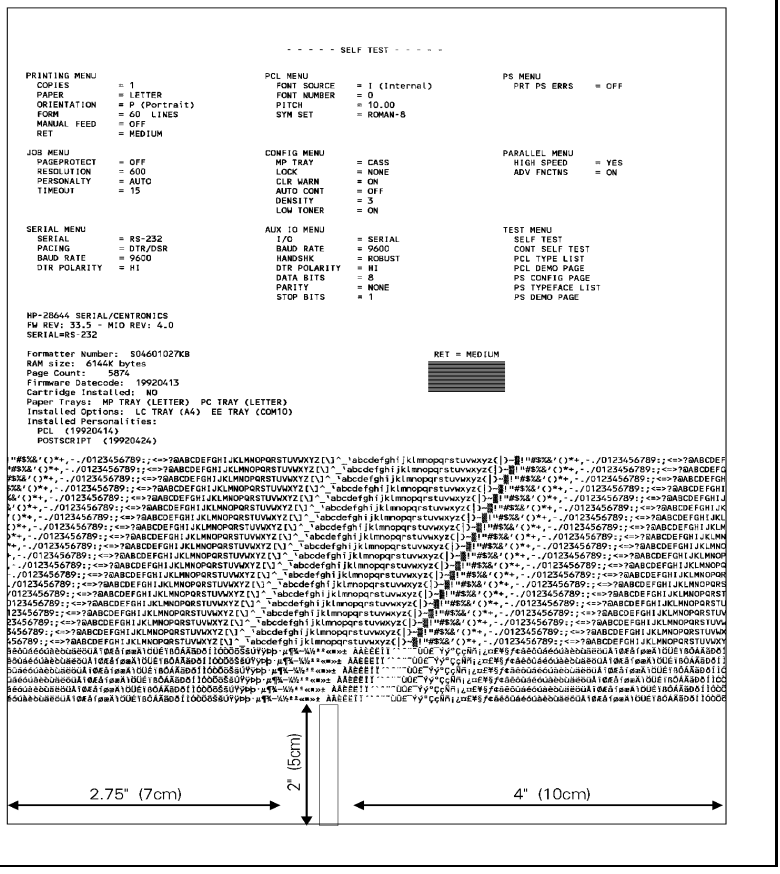


**Figure 7-9 PS5 Test Sheet**

## Table 7-25 Vertical Dark Streaks

| Possible Cause | Action |
|---|---|
| Dirty Primary Charge roller. | Change the Toner Cartridge. |
| Bad Toner Cartridge. | Replace the Toner Cartridge. |
| Incompatible media. During media manufacture, inks, or other finishing processes may interfere with the electro-photographic or fusing process. | Change type of media. |

## Table 7-26 Large Print Voids

| Possible Cause | Action |
|---|---|
| Defective laser shutter. | Check the laser shutter for free operation when inserting the EP Toner Cartridge. |
| EP Cartridge Support damaged, improperly positioned, or missing. | Refer to item 4 in Figure 8-4a. Guide must be installed properly above the EP Cartridge, between the laser shutter opening and the fuser stop plate. |
| Bad transparencies. Transparencies exhibit this problem if they are not designed for proper toner adhesion. | Use Hewlett-Packard-approved transparencies (refer to the *HP LaserJet Family Paper Specifications Guide)*. |
| Bad paper lot. The surface of the paper may be too smooth for proper toner adhesion. | Try a known good paper from a reliable source (refer to the *HP LaserJet Family Paper Specifications Guide*). |
| Poor fusing. Toner may not be fused properly to the media. | Try a known good paper from a reliable source (refer to the *HP LaserJet Family Paper Specifications Guide*). |
| Print image fusing may not occur correctly. | Replace Fuser Assembly (see Figure 7-11 for location). |
| Wet paper. The paper may be damp. | Try a new batch of paper. Store the paper in a dry area. |
| Transfer roller is dirty. | Replace the transfer roller. |

## Table 7-27 Background Scatter

| Possible Cause | Action |
|---|---|
| Defective Toner Cartridge. The Toner Cartridge may be internally damaged. | Replace the Toner Cartridge. |
| Bad paper lot. The paper moisture content, conductivity, or surface finish may be incompatible with the electro-photographic process. | Try a different paper lot (see the *HP LaserJet Family Paper Specifications Guide*) for paper specifications. |
| Print density set incorrectly. If the print density is set incorrectly, background scatter can result, particularly with envelopes. | Adjust the print density. |
| Inside of printer dirty. If toner dust leaked out of the EP Toner Cartridge, this problem can occur. | Clean the inside of the printer. |

**Table 7-28** White or Blank Pages

| Possible Cause | Action |
|---|---|
| Defective laser shutter. | Check the laser shutter for free operation when inserting the EP Toner Cartridge. |
| EP Cartridge Support damaged, improperly positioned, or missing. | Refer to item 4 in Figure 8-4a. Guide must be installed properly above the EP Cartridge, between the laser shutter opening and the fuser stop plate. |
| Toner Cartridge. No toner is available for print. | Remove sealing tape or replace the Toner Cartridge. |
| No Transfer Roller voltage. Without transfer charge roller voltage, toner cannot be attracted from the surface of the drum to the paper. | Perform the “Half Self Test Functional Check” which follows to check all other electro-photographic processes. |
| No Developing Bias. With no Developing Bias charge, toner is not attracted to the drum. | Refer to “High Voltage System Checks.” |
| No drum ground path. With no ground path the drum cannot discharge. The negative charge on the drum repels toner, and leaves a white page. | Refer to “High Voltage System Checks.” |
| Bad Laser Scanning Cable Assembly. Low-level signals exchanged between the Laser/Scanning Assembly, and the DC Controller may be affecting laser output. | Replace the Laser/Scanning Cable Assembly. |

# Image Formation Troubleshooting

## Half Self-Test Functional Check

The electro-photographic process can be subdivided into the following stages:

- Cleaning (Physical and Electrostatic).
- Conditioning (Primary Charge Roller).
- Writing (Laser Modulation).
- Development (Formation of the Toner Image).
- Transfer (Charge to transfer the image to paper).

The purpose of the Half Self Test Check is to determine which process is malfunctioning. Perform the test as follows:

1 Initiate an `05 SELF TEST`.
2 Open or switch OFF the printer after the paper advances halfway through the printer (the leading edge of the paper should advance at least past the Transfer Charge roller).
3 Remove the Toner Cartridge.
4 Open the Toner Cartridge's drum shield to view the drum's surface.

If a dark and distinct toner image is present on the drum's surface, assume that the first four functions of the electro-photographic process are functioning, and troubleshoot the failure as a transfer problem. If NO image is present on the photoconductive drum, perform the checks shown on the following pages.

- The Drum Rotation Functional Check.
- High voltage Power Supply Check.

### Drum Rotation Functional Check

The photoconductive drum, located in the Toner Cartridge, must rotate for the print process to work. The photoconductive drum receives its drive from the Main Motor gear train. To verify whether the drum is rotating:

1. Open the printer's Top Cover Assembly.
2. Remove the Toner Cartridge. Open the Toner Cartridge's drum shield (cover) to view the photoconductive drum.
3. Mark the gear with a felt-tipped marker. Note the position of the mark.
4. Install the EP Toner Cartridge, and close the Top Cover. The 1-second startup sequence should rotate the drum enough to move the mark. Open the printer, and inspect the drum. Verify that the mark moved.

If the mark did not move, inspect the gear train to ensure that it is meshing with the Toner Cartridge gears. If the drive gears appear functional, and the drum does not move, replace the Toner Cartridge.

**Note** This test is especially important if refilled Toner Cartridges were used.

### High Voltage Power Supply Assembly

The High Voltage Power Supply Assembly provides the necessary voltages for the printer's electro-photographic processes. The +24B VDC supply is used to power the High Voltage Power Supply Assembly. A summary of the major components of the high voltage system, is given in the table below (see Figure 7-18 for High Voltage PCA layout).

**Table 7-29** High Voltage System Checks

| Checks | Action |
|---|---|
| Are the connectors for the Primary Charge roller, Drum Ground, Developing Bias, Toner Level Sensor damaged, corroded, dirty, or missing? Also check the Toner Cartridge. | Visually inspect each item. If any are damaged, correct as necessary. Replace the High Voltage Power Supply if the connection is not repairable. Check that all wires are connected to their respective terminals. |
| Are the HVPS connections bent or broken? | Clean the terminals with alcohol only. |

# Interface Troubleshooting

This section provides an overview of the printer interface requirements. Refer to Chapter 3 for detailed information about the printer interfaces and configuration.

## Communications Check

**Note**

Communication problems are normally the customer's responsibility. Time spent attempting to resolve these problems may not be covered by the product's Hewlett-Packard warranty.

The Customer Service Center (CSC) is available to the customer to help them through these problems. The CSC telephone number is: (208) 323-2551.

If the printer is not connected to an MS-DOS-based host, proceed to the Communications Checks table in this section.

**Test Message**

After the printer is installed, verify communications between the printer and the IBM-compatible computer. Enter the following at the DOS prompt:

```
C:\DIR>LPT1 Enter
```

The printer should print a directory listing of the C:\ directory. If the Communications Check fails, proceed as follows.

### Parallel DOS Commands

If the previous check did not produce the desired result, ensure that the AUTOEXEC.BAT file contains the following statements for parallel interface communications:

```
MODE LPT1:,,P
```

For MS-DOS version 4.0 and above, enter:

```
MODE LPT1:,,B
```

**Note** This example assumes that you are using parallel printer port LPT1. If you are using LPT2 or LPT3, replace LPT1 in the example with the appropriate printer port.

If the problem persists, proceed to Table 7-30 “Communications Checks.”

### Serial MS-DOS Commands

Most IBM compatible computers default to a parallel printer port. To ensure that information is sent to your serial printer port, type the following MS-DOS commands at your MS-DOS prompt, or include them in your AUTOEXEC.BAT file.

```
MODE COM1:9600,N,8,1,P

MODE LPT1:=COM1
```

For MS-DOS version 4.0, or above, enter:

```
MODE COM1:9600,N,8,1,B

MODE LPT1:=COM1
```

**Note** These examples assume that you are using serial printer port COM1. If you are using COM2 or COM3, replace COM1 with the appropriate printer port.

If the problem persists, proceed with the following checks in Table 7-30.

## Communications Checks

**Table 7-30** Communications Checks

| Checks | Action |
|---|---|
| Is your computer configured to the parameters described in the configuration instructions? | These parameters are required to communicate with the printer. Verify your computer's communications port configuration matches these parameters.<br><br>Note: If these parameters are not set properly, they may yield a `40`, `20`, or `22 ERROR` on the printer's Control Panel. |
| **For Serial Communications only** | |
| Does the printer's baud rate match that of the computer's communications port? | Run the printer's Self Test to verify the baud rate setting. At the computer, verify that the baud rate is set correctly in any configuration files.<br><br>Note: A baud rate problem may cause a `40 ERROR`. |
| Are you using the correct cable for communications between the computer and the printer? | See the cable wiring in Chapter 3.<br><br>Hint: On an RS-232 cable, pins 2 and 3 may need to be reversed at the printer-end of the cable. |
| Are you using the correct RS-232-C protocol? | During the communications "handshake," the printer transmits both the XON/XOFF signal, and the DTR signal. The DTR (Data Terminal Ready) signal may be either negative going, or positive going.<br><br>DTR polarity is set at the printer's Control Panel. The XON may be set to normal (only transmitted when data is needed), or Robust XON (transmitted every second). This feature is configurable from the Control Panel. DTR is available at pin 20, and XOFF is transmitted from pin 2 of the printer. |

**Table 7-30** Communications Checks (continued)

| Checks | Action |
|---|---|
| If using a serial interface, is the cable longer than 50 feet (15 meters)? | The maximum recommended cable length for RS-232 serial communications is 50 feet. Use RS-422 for the HP LaserJet 4/4M printer, or move the printer closer to the host. |
| If using a Centronics parallel cable, is it over 10 feet (3 meters) long? | Use a serial interface connection, or move the printer closer to the host. |
| Do all the current Control Panel Configuration Menu items match the host system's parameters? | Make appropriate changes. If host system changes are made, be sure to reboot the system, or otherwise ensure the changes are in effect. |
| Does the printer have a bad interface port? | If possible, try a different printer interface than the one with the problem. Reconfigure the printer and host. |
| Does the host have a bad interface port? | If possible, try a different host system port, and reconfigure both the host and printer appropriately. |

If the host system and printer still are not communicating, and steps 1 through 9 have been completed, replace the Formatter PCA and the MIO card, and reconfigure the printer. If the problem persists, a protocol analyzer may be needed to find the source of the problem.

**Caution** HP LaserJet printers are not designed to work with mechanical switch-box products without proper surge protection. These devices generate high transient voltages that cause permanent damage to the Formatter PCA. This circumstance is not covered by the Hewlett-Packard warranty.

# MIO Troubleshooting

The Self Test Printout and explanation shown on the following pages contain valuable information regarding the current status of the MIO. Before attempting to troubleshoot a network problem or notifying your network consultant of a problem, always obtain a Self Test Printout.

## Troubleshooting Hints

The JetDirect Card Status Block (see Figure 7-10, status block 2) indicates the functionality of the JetDirect Card. An I/O NOT READY STATUS indicates a problem. A 2-digit error code follows the message. Use the HP JetDirect Network Interface Configuration Guide (P/N J2552-90001) for detailed explanations of errors and suggested corrective action.

NETWORK STATISTICS, status block 3, indicates network activity. Bad packets, framing errors, unsendable packet and collisions should be minimal. If unusually high numbers of these statistics occur, please advise the network administrator.

The various Network Operating Systems supported by these printers are indicated in status blocks 4, 5, 6, and 7. When the status is READY, the printer has successfully connected to the host network server and is awaiting data. Other messages indicate the printer is either still trying to successfully connect to the network or a configuration problem has been encountered. Refer to the HP JetDirect Network Interface Configuration Guide (P/N J2552-90001) for detailed explanations of these messages.

**Explanation of Self Test Printout**

**1** Multiple Environment Information. General information about your JetDirect MIO.

**2** JetDirect Card Status. I/O CARD READY indicates the interface is correctly configured and capable of communicating. I/O CARD NOT READY indicates there is a problem with the interface, configuration, or server.

**3** Network Statistics. A list of network statistics is generated by the JetDirect MIO. All statistic counters are reset to zero when the printer is turned OFF.

Supported Network Operating Systems

**4** Novell Status Information

**5** Apple Ether Talk/Local Talk Status Information

**6** HP-UX, Solaris and Sun/OS (TCP/IP) Status Information

**7** Lan Server/Lan Manager/Windows for Workgroups/Windows NT Status Information

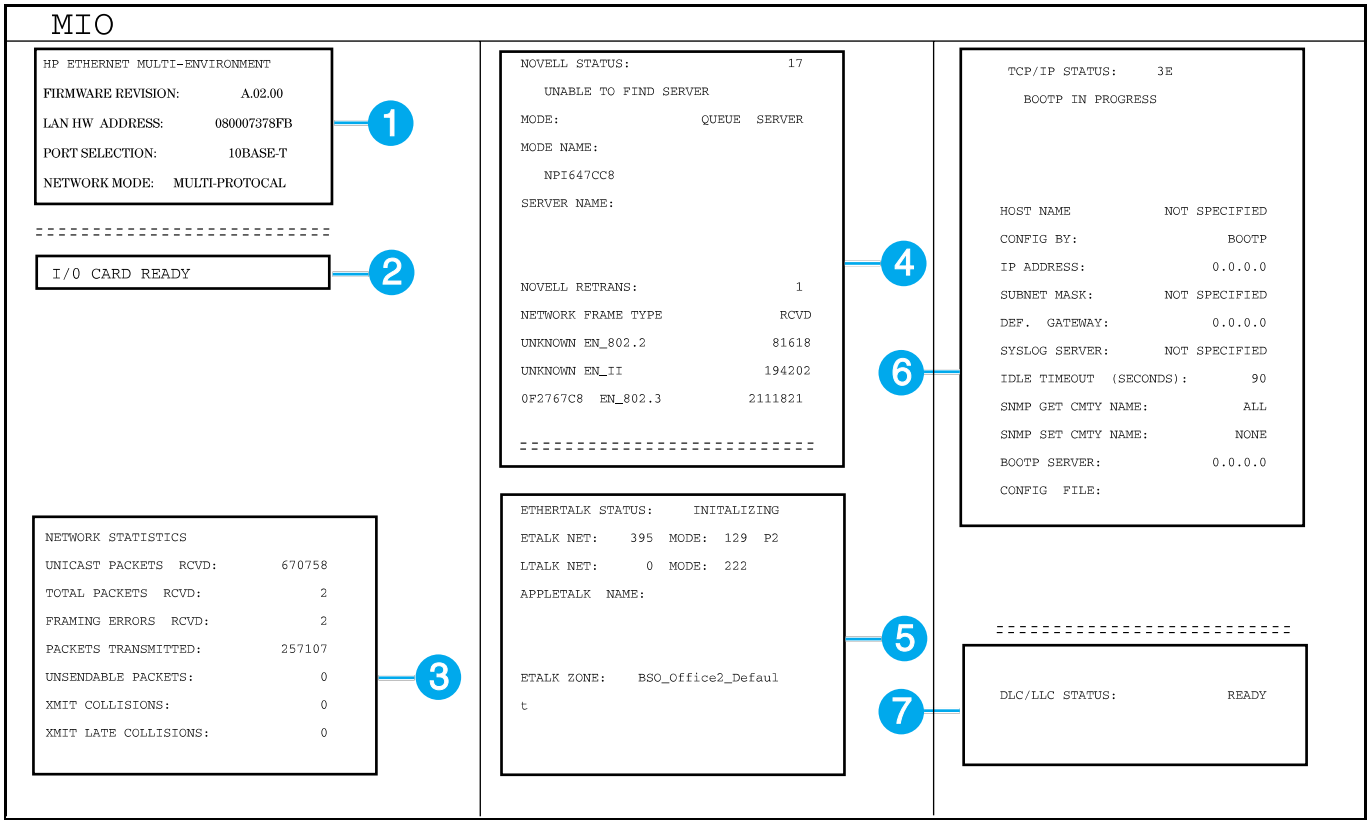


Figure 7-10 MIO Staus Information on the Self Test Printout

# Troubleshooting Aids

## Component Locations

The following illustrations help you quickly find the parts discussed in this chapter.

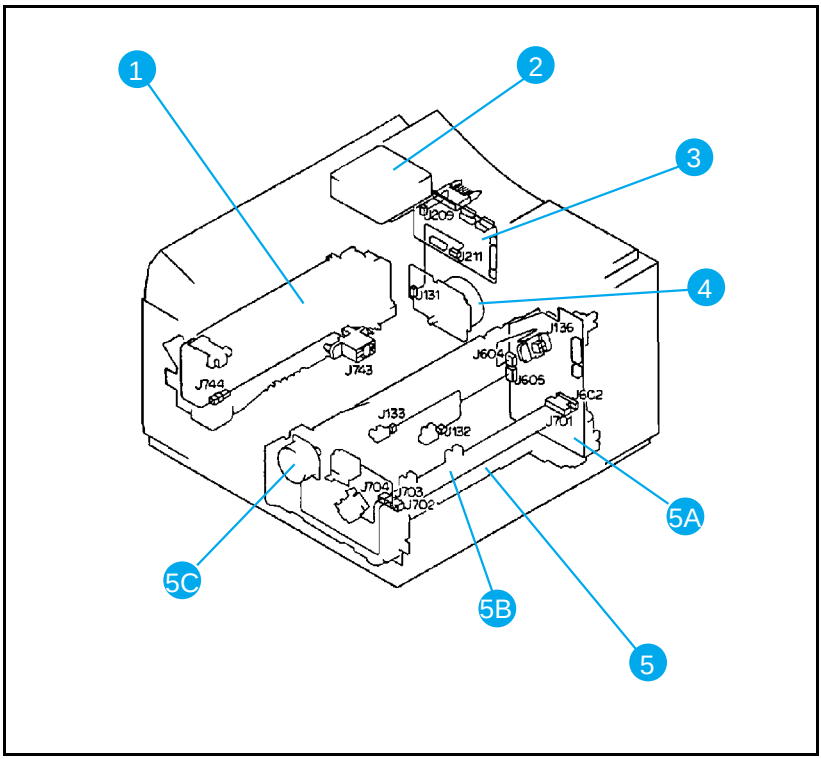


**Figure 7-11 Major Assembly and Connector Locations**

**Table 7-31**

| Number | Part | Number | Part |
|---|---|---|---|
| 1 | Fuser Assembly | 5 | Paper Feed Assembly |
| 2 | Cooling Fan | 5A | Paper Control PCA |
| 3 | DC Controller PCA | 5B | Sensor PCA |
| 4 | Main Motor Assembly | 5C | Paper Pickup Motor (M2) |

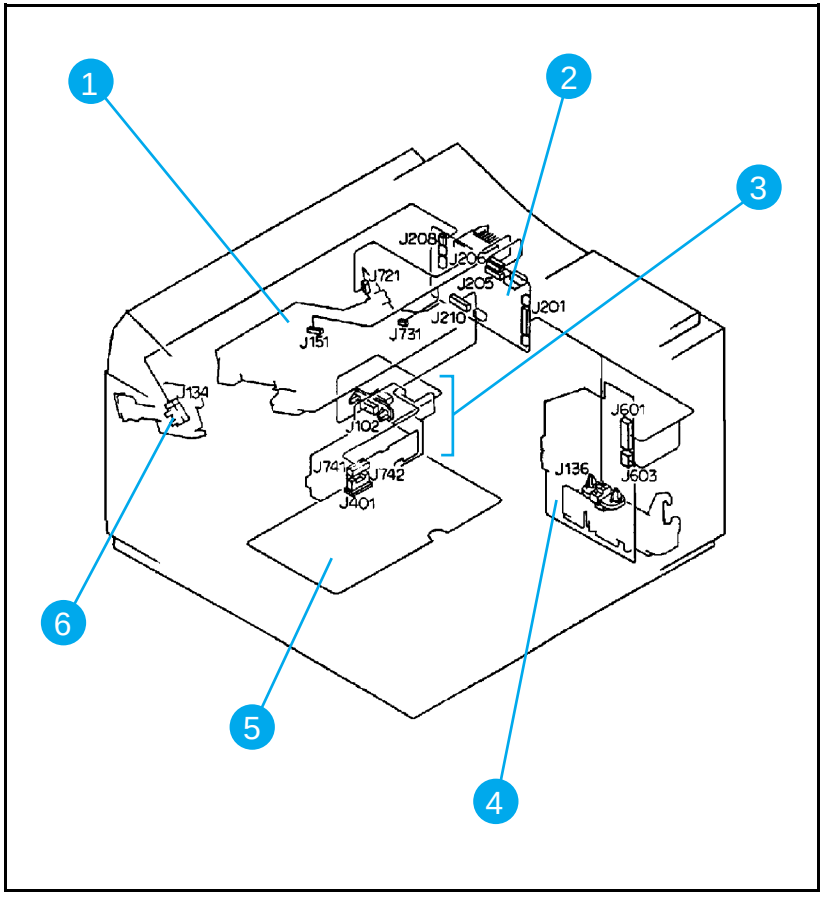


**Figure 7-12 Major Assembly and Connector Locations (2 of 3)**

**Table 7-32**

| Number | Part |
|---|---|
| 1 | Laser/Scanner Assembly |
| 2 | DC Controller PCA |
| 3 | Interconnect PCA Assembly |
| 4 | Paper Control PCA |
| 5 | High Voltage Power Supply PCA |
| 6 | Exit Sensor Assembly |

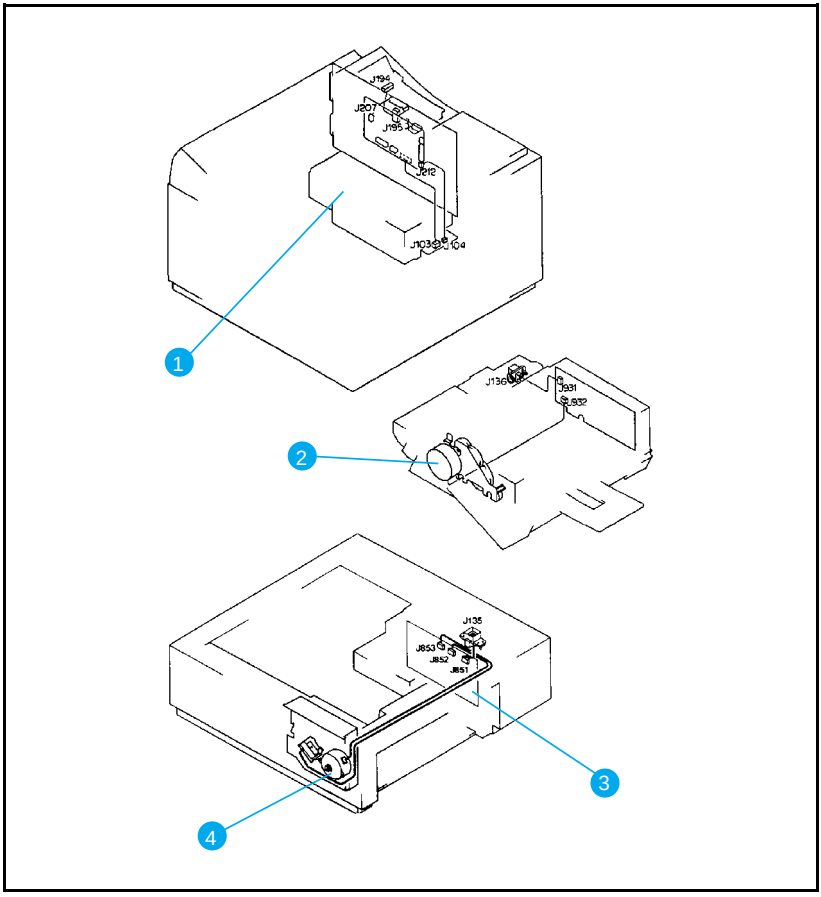


**Figure 7-13 Major Assembly and Connector Locations (3 of 3)**

**Table 7-33**

| Number | Part |
|---|---|
| 1 | Power Supply Assembly |
| 2 | Envelope Feeder Main Motor (M4) |
| 3 | Lower Cassette Drive PCA |
| 4 | Lower Cassette Main Motor (M3) |

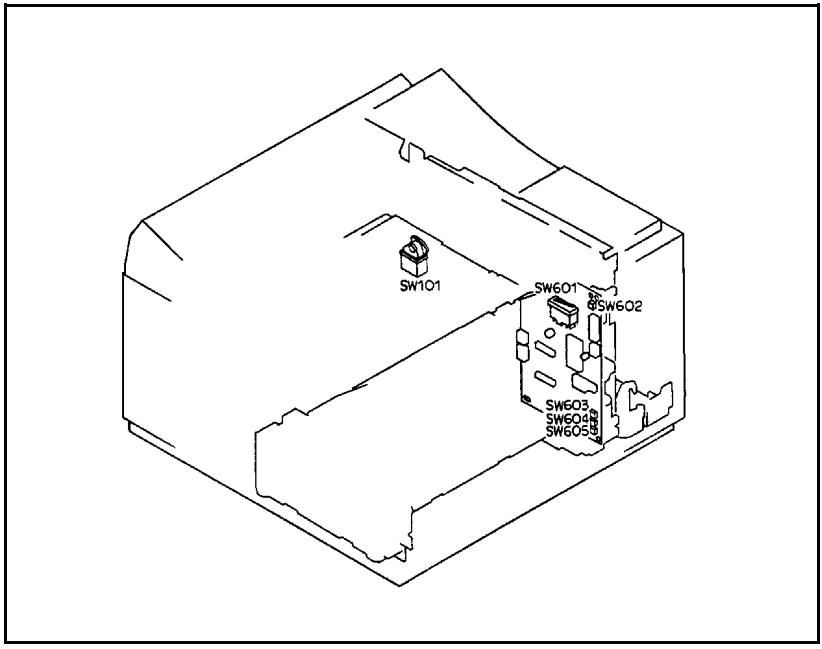


**Figure 7-14 Switch Locations**

**Table 7-34**

| Number | Part |
|---|---|
| SW101 | AC Input ON/OFF Switch (Power Supply Assembly) |
| SW 601 | Top Cover Open Sensing Switch |
| SW602 | TEST PRINT Switch |
| SW603 | PC (Tray 2) Tray Size Switches |
| SW604 | |
| SW605 | |

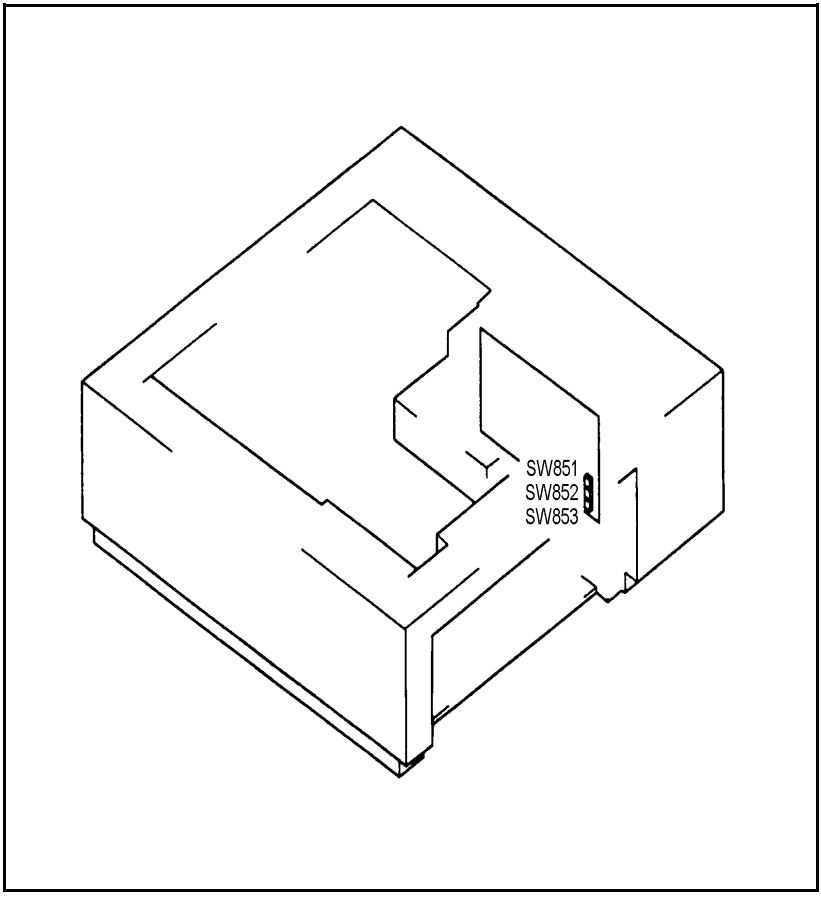


**Figure 7-15 Optional 500 Sheet Lower Cassette**

**Table 7-35**

| Number | Part |
|---|---|
| SW851 | Optional 500 Sheet Paper Feeder Paper Tray (Tray 3) Size Switches |
| SW852 | |
| SW853 | |

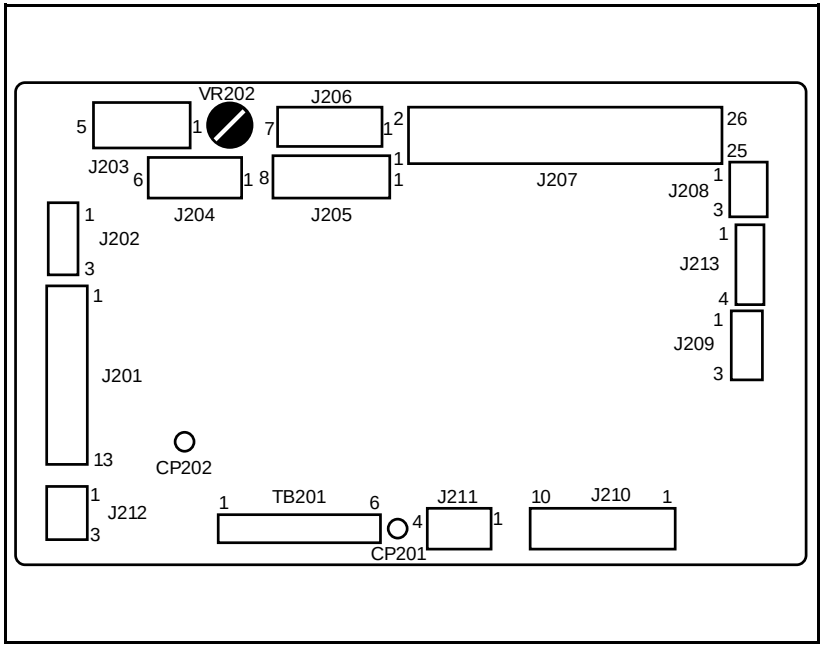


**Figure 7-16 DC Controller PCA Layout—LaserJet 4/4M**

**Table 7-36**

| Number | Part |
|---|---|
| J201 | Paper Control PCA |
| J205 | Scanner/Beam Detect |
| J206 | Laser Drive PCA |
| J207 | Formatter PCA |
| J208 | Deliver/Exit Sensor PS3 |
| J210 | Interconnect PCA |
| J209 | Cooling Fan |
| J211 | Main Motor |
| J212 | Power Supply/Fuser Drive |
| VR202 | Registration Adjustment |
| TB201 | DC Voltages (from Power Supply) |

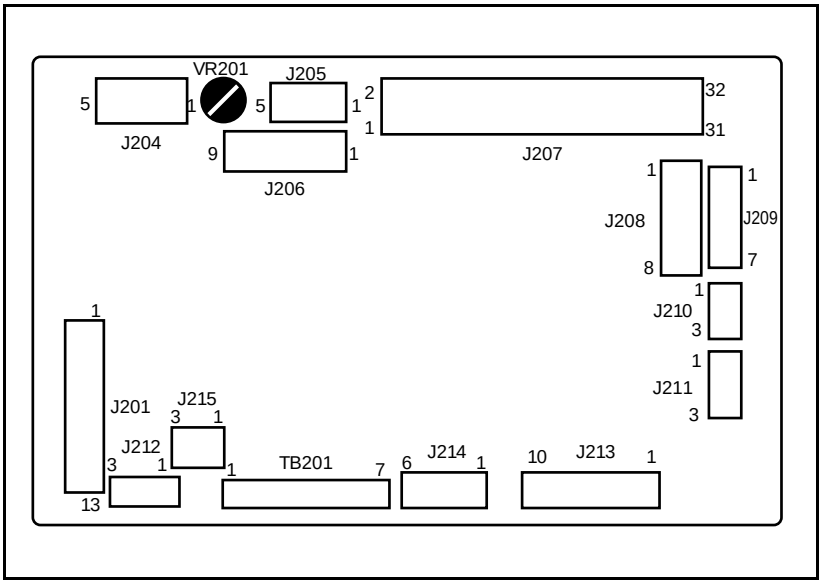


**Figure 7-17 DC Controller PCA Layout —LaserJet 4 Plus/5**

**Table 7-37**

| Number | Part |
|---|---|
| J201 | Paper Control PCA |
| J208 | Scanner/Beam Detect |
| J209 | Laser Drive PCA |
| J207 | Formatter PCA |
| J210 | Deliver/Exit Sensor PS3 |
| J213 | Interconnect PCA |
| J211 | Cooling Fan |
| J214 | Main Motor |
| J215 | Power Supply/Fuser Drive |
| VR201 | Registration Adjustment |
| TB201 | DC Voltages (from Power Supply) |
| J206 | Control Panel |

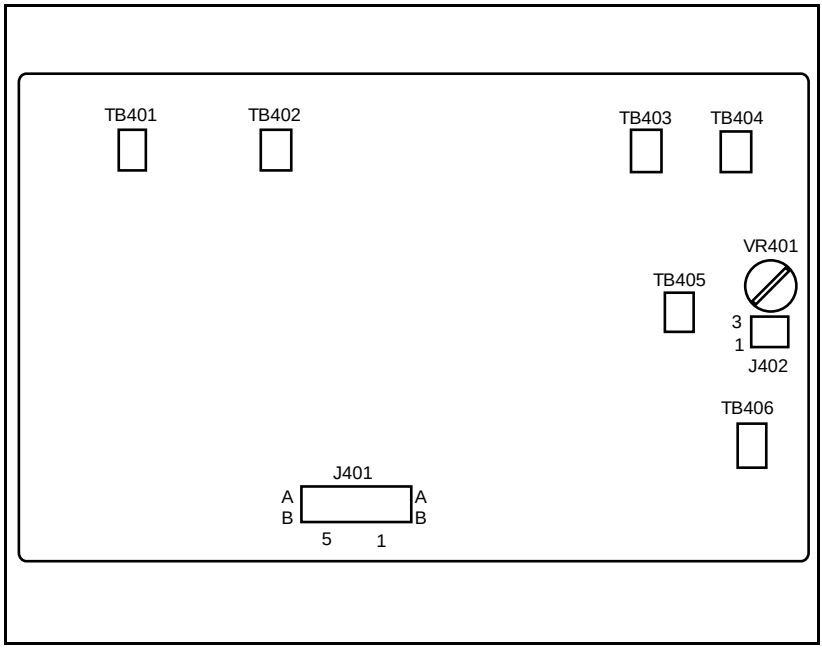


**Figure 7-18 High Voltage PCA Layout**

**Table 7-38**

| Number | Part |
|---|---|
| J401 | High Voltage PS Connection To DC Controller PCA via Interconnect PCA |
| TB401 | Transfer Roller Contact |
| TB402 | Drum Ground Contact |
| TB403 | Toner Low/EP Toner Cartridge-in-Place Contact |
| TB404 | GND |
| TB405 | Developer Roller Contact |
| TB406 | Charge Roller Contact |
| VR401 | Factory Adjustment Only |

## Repetitive Defect Template

Repetitive print defects usually are associated with a specific roller within the printer, or the Toner Cartridge. The following templates are provided to help quickly isolate the cause of repetitive print defects. Align the first occurrence of the defect with the top of the “ruler”, and measure to the next occurrence of the defect to determine the roller in question. When you are certain that your defect pattern matches the pattern of the template, replace the indicated roller.

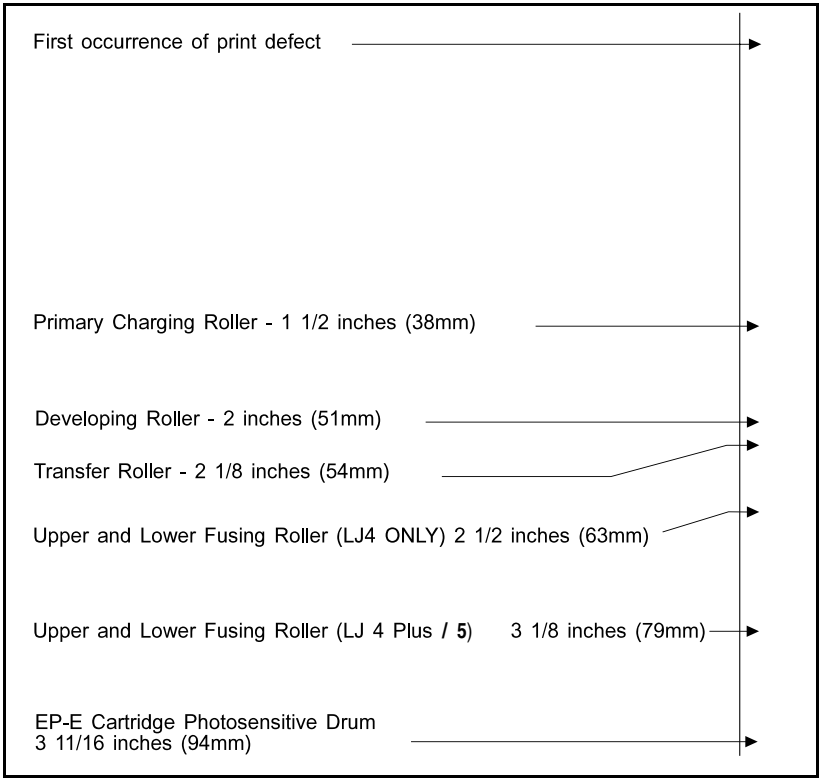
First occurrence of print defect
Primary Charging Roller - 1 1/2 inches (38mm)
Developing Roller - 2 inches (51mm)
Transfer Roller - 2 1/8 inches (54mm)
Upper and Lower Fusing Roller (LJ4 ONLY) 2 1/2 inches (63mm)
Upper and Lower Fusing Roller (LJ 4 Plus / 5) 3 1/8 inches (79mm)
EP-E Cartridge Photosensitive Drum
3 11/16 inches (94mm)

**Figure 7-19 Repetitive Defect Ruler**

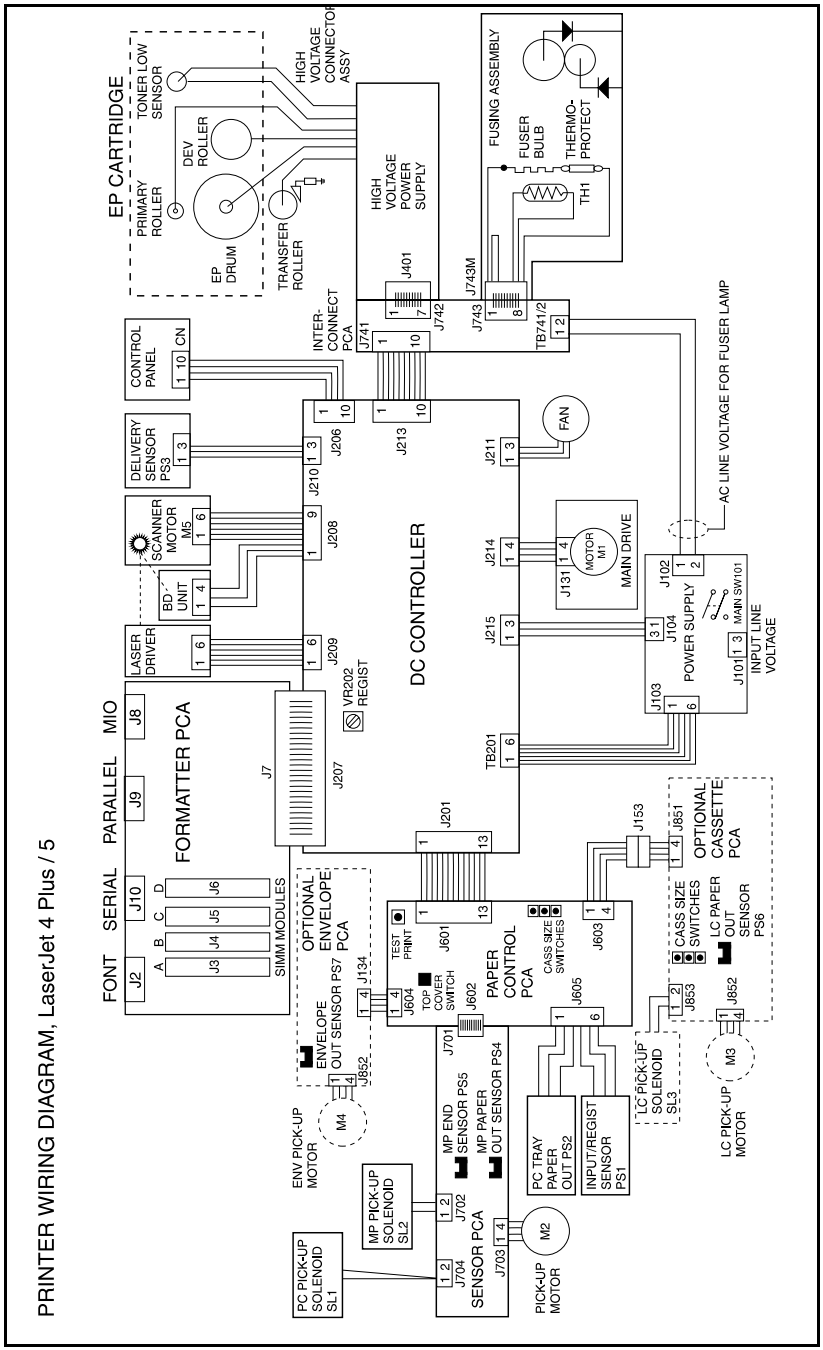


**Figure 7-20 Main Wiring Diagram (LJ 4+/5 only)**

## Voltage Test Points

The operating voltages of the printer can be verified by:

1 Listening for the exhaust fan. A rotating fan indicates that the +5 VDC and +24A VDC voltages are present. (The fan runs on +24A VDC. The +5 VDC enables the +24A VDC.)
2 Listen for the Main Motor. If the Main Motor runs, the +24B VDC is enabled, therefore +24A VDC must be present.

### Measuring the DC Voltage Levels

The DC voltage levels can be measured directly on the DC Controller TB 201. TB 201 connects the DC Controller with the Power Supply. (See the Main Wiring Diagram, and Figure 7-16 or 7-17, the DC Controller PCA Layout in the previous section.) Remove the Formatter cage to access the DC Controller. The voltages on TB201 are as follows:

**Table 7-39** TB 201Voltages

| Voltage | Color | Pin Number |
|---|---|---|
| +5 VDC | Brown | 1, 2 |
| +24 VDC | Red | 3 |
| Ground | Blue | 4, 5, 6 |

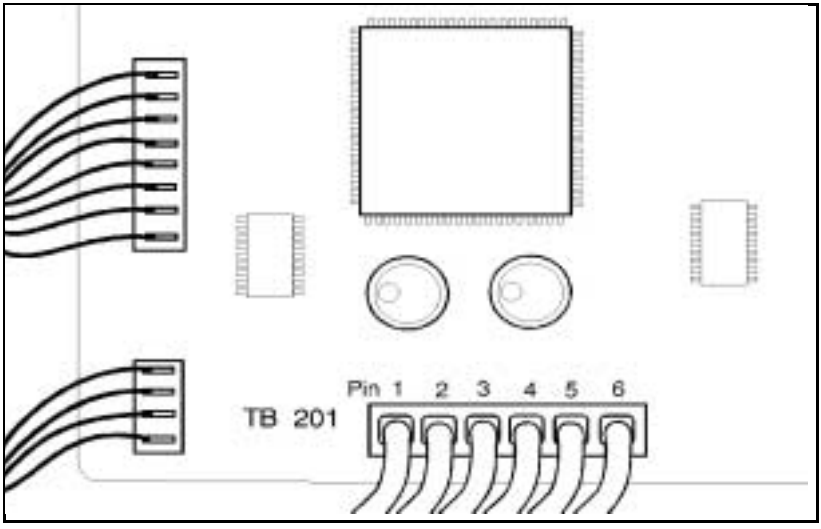


**Figure 7-21** TB 201 Voltages

# 8

# Parts and Diagrams

## How To Use the Parts Lists

The figures in this chapter illustrate the major subassemblies and component parts of the HP LaserJet 4/4M, LaserJet 4 Plus/ 4M Plus, and LaserJet 5/5M/5N printers. When ordering an electrical part, pay special attention that the part chosen has the correct voltage rating for the machine under repair.

Part numbers with no indicator in the *Notes* column are stocked and can be ordered through Hewlett-Packard's Support Materials Organization (SMO). Parts marked with an **S** in the *Notes* column are special order parts which can be ordered through SMO but may have an eight-week lead time.

An alphanumeric index referencing all part numbers is included at the end of this chapter (see **Parts List**, page 8-40).

**Note** Not all parts are orderable. The parts listed are the only orderable parts. Parts that have no reference designator or part number are not field-replaceable and cannot be ordered through SMO.

Figures referred to in the tables are placed before the table throughout the chapter.

Accessory Parts are listed on 8-33. This list includes such items as the MIO and SIMM cards.

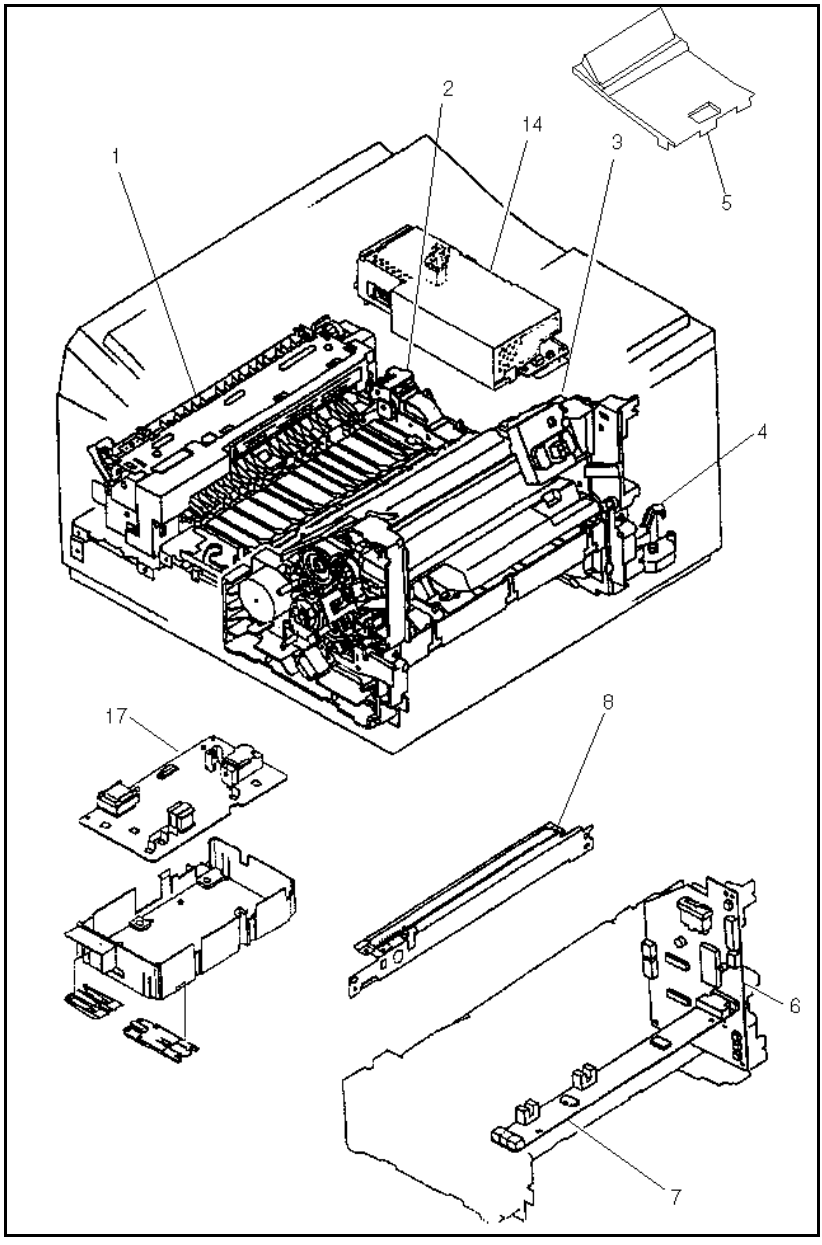


Figure 8-1a Field-Replaceable Assemblies (1 of 2)

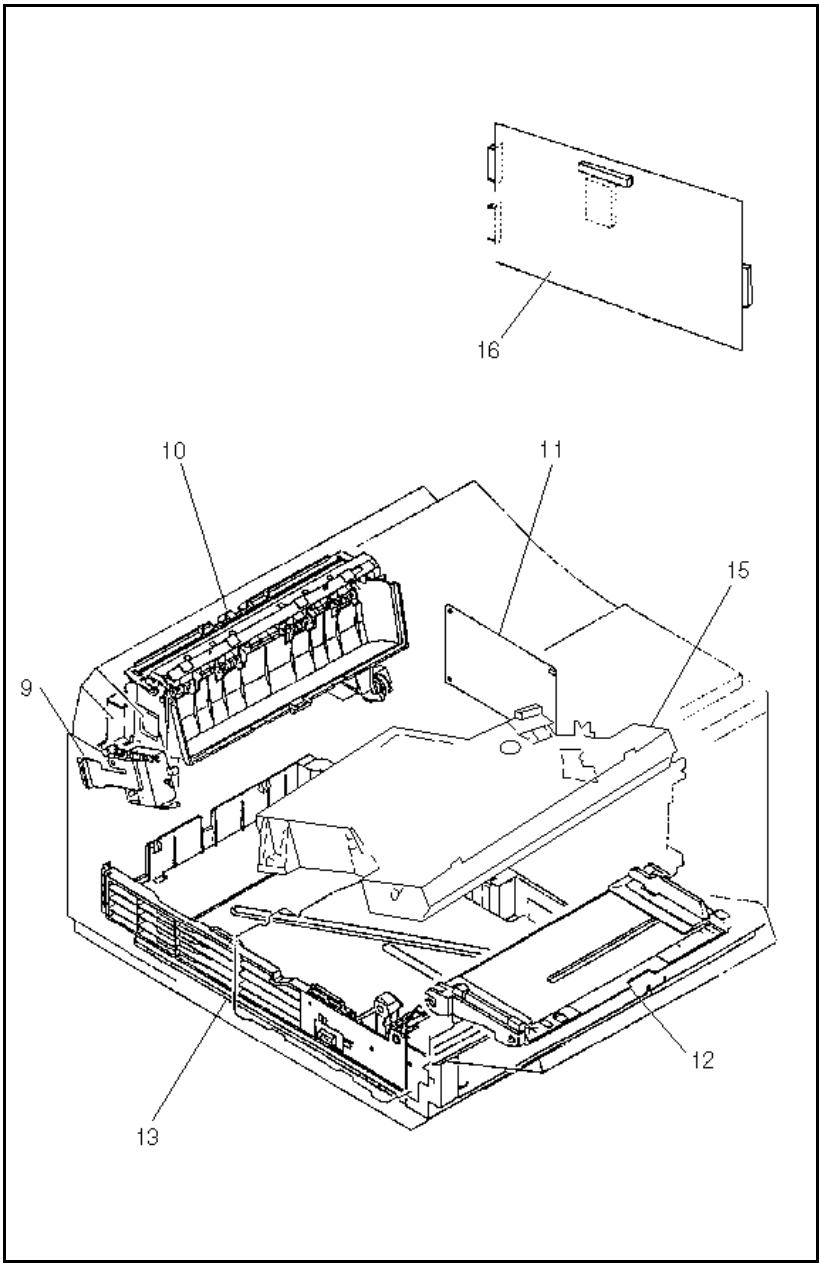


**Figure 8-1b Field-Replaceable Assemblies ( 2 of 2)**

## Table 8-1 Field-Replaceable Assemblies

| Part # | Ref | Exchng # | Description | Fig. # |
|---|---|---|---|---|
| RG5-0454-000CN<br>RG5-0879-130CN | 1 | C2001-69003<br>C2037-69001 | Fusing Ass'y (100/110V)<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-10 |
| RG5-0455-000CN<br>RG5-0880-130CN | 1 | C2001-69004<br>C2037-69002 | Fusing Ass'y (220/240V)<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-10 |
| RH7-1151-000CN<br>RH7-1169-000CN | 2 | | Main Motor<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-4b |
| RG5-0451-000CN<br>RG5-0877-000CN<br>RG5-2195-000CN | 3 | C2001-69005<br>C2037-69003<br>C3916-69005 | Paper Feed Assembly<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-6 |
| RB1-2119-000CN<br>RB1-7907-000CN | 4 | | Main Switch Assy<br>LJ 4 & 4+<br>LJ 5 | 8-5 |
| RG5-0478-000CN<br>RG5-1076-000CN<br>RG5-2238-000CN | 5 | C2001-69010<br>C2037-69005 | Display Ass'y w/o overlay<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-3 |
| RG5-0512-000CN | 6 | | Paper Control PCA | 8-6a |
| RG5-0514-000CN | 7 | | Sensor PCA | 8-6b |
| RG5-0469-000CN | 8 | | Transfer Guide Assembly | 8-1a |
| RG5-0475-060CN | 9 | | Paper Output Sensor Ass'y | 8-9 |
| RG5-0456-000CN<br>RG5-0886-000C<br>RG5-2189-000CN | 10 | | Paper Output Assembly<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-8 |
| RG5-0511-000CN<br>RG5-0966-030CN | 11 | C2001-69002<br>C2037-69004 | DC Controller PCA<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-1b |
| RG5-0472-000CN<br>RG5-0888-000CN<br>RG5-2199-000CN | 12 | | MP Tray (Tray 1)<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-7 |

**Table 8-1** Field-Replaceable Assemblies (continued)

| Part # | Ref | Exchng # | Description | Fig. # |
|---|---|---|---|---|
| C2085B<br>C2085E<br>C3925A | 13 | | PC Tray (Tray 2) (ltr)<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-14 |
| C2085C<br>C2085F<br>C3926A | 13 | | PC Tray (Tray 2) (A4)<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-14 |
| RG5-0531-000CN<br>RG6-2499-000CN | 14 | C2001-69007<br>C2037-69006 | Power Supply (100/120V)<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-1a |
| RG5-0553-000CN<br>RG5-2500-000CN | 14 | C2001-69008<br>C2037-69007 | Power Supply (220/240V)<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-1a |
| RG5-0449-000CN<br>RG5-0903-070CN | 15 | C2001-69006<br>C2037-69008 | Laser/Scanner Ass'y<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-1b |
| C2002-67901<br>C2038-60004<br>C3919-67901 | 16 | C2002-69001<br>C2038-69004<br>C3919-69001 | Formatter PCA<br>LaserJet 4<br>LaserJet 4 Plus<br>LaserJet 5 | 8-1b |
| RG5-0513-000CN<br>RG5-0969-040CN | 17 | C2001-69009<br>C2037-69009 | High Voltage Power Supply<br>LaserJet 4<br>LaserJet 4 Plus/5 | 8-1a |

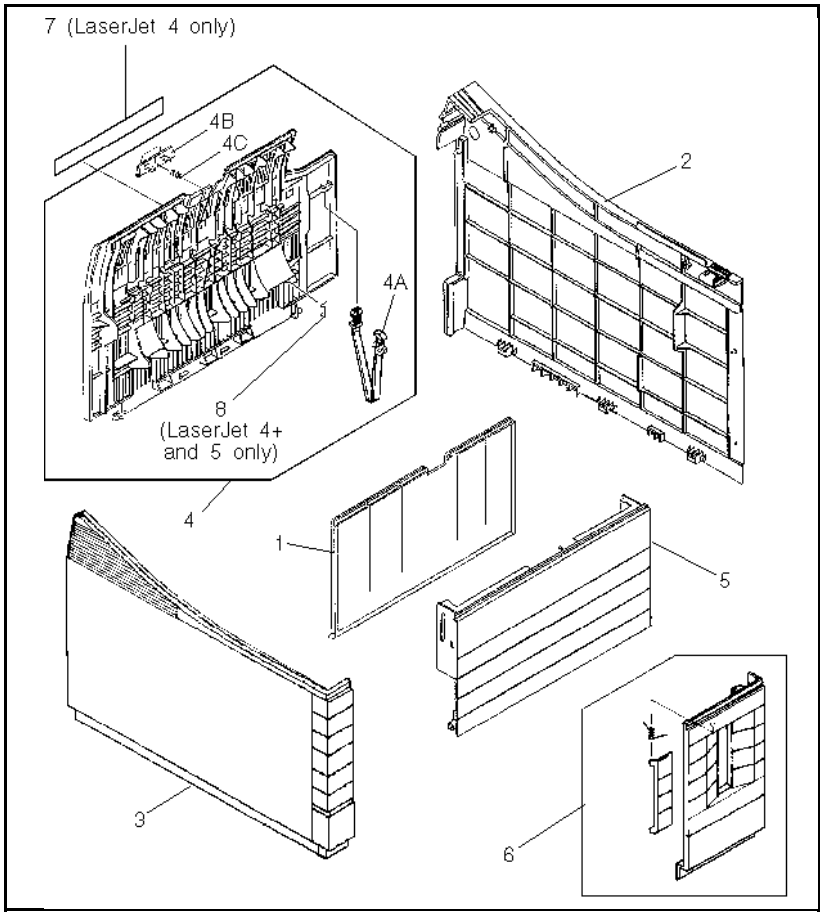


**Figure 8-2 Covers and Panels**

## Table 8-2 Covers and Panels

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2143-000CN<br>RB1-3558-000CN<br>RB1-7885-000CN | LJ4<br>LJ4+<br>LJ5 | MP Tray Extender |
| 2 | RB1-2346-000CN<br>RB1-3470-000CN<br>RF5-1644-000CN | LJ4<br>LJ4+<br>LJ5 | Right Cover |
| 3 | RB1-2347-000CN<br>RB1-3471-000CN<br>RB1-7881-000CN | LJ4<br>LJ4+<br>LJ5 | Left Cover |
| 4 | RF5-0533-000CN<br>RF5-0733-000CN<br>RF5-1645-000CN | LJ4<br>LJ4+<br>LJ5 | Rear Door Assembly |
| 4A | RB1-2354-000CN | | Rear Door Support Strap |
| 4B | RB1-2335-000CN<br>RB1-7890-000CN | LJ4/4+<br>LJ5 | Rear Door Latch |
| 4C | RS5-2219-000CN<br>RS5-2571-000CN | LJ4/4+<br>LJ5 | Rear Door Spring |
| 5 | RB1-2351-000CN<br>RB1-3559-000CN<br>RB1-7886-000CN | LJ4<br>LJ4+<br>LJ5 | MP Door |
| 6 | RG5-0459-000CN<br>RB1-7889-000CN | LJ4/4+<br>LJ5 | Font Door Cover<br>Right Front Cover |
| 7 | RS5-8205-000CN | LJ4 | Label 110/115V |
| 7 | RS5-8916-000CN | LJ4 | Label 220/240V |
| 8 | RB1-3475-000CN | LJ4+ | Rear Door Retainer |

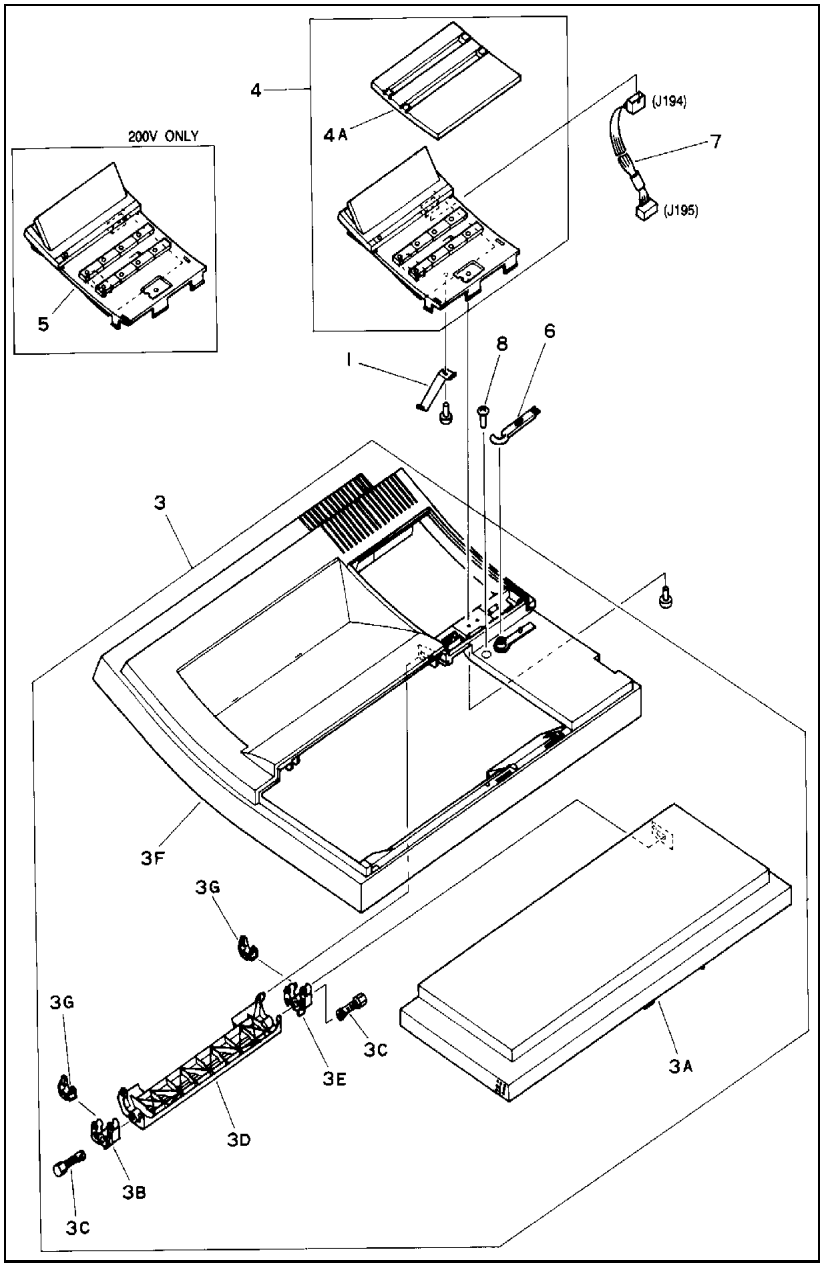


**Figure 8-3a Top Cover Assembly for LaserJet 4/4+**

## Table 8-3a Top Cover Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2330-000CN | S | Spring, Leaf |
| 3 | RG5-0458-000CN<br>RG5-0872-000CN | LJ4<br>LJ4+ | Upper Cover Assembly |
| 3A | RB1-2322-000CN<br>RB1-3474-000CN | LJ4<br>LJ4+ | Top Cover Door |
| 3B | RB1-2323-000CN | | Hinge, Bracket |
| 3C | RB1-2324-000CN | 2 ea. | Hinge, Pin |
| 3D | RB1-2329-000CN<br>RB1-3473-000CN | LJ4<br>LJ4+ | Hinge, Arm |
| 3E | RB1-2364-000CN | | Hinge, Bracket |
| 3F | RF5-0360-000CN<br>RF5-0732-000CN | LJ4<br>LJ4+ | Cover, Upper |
| 3G | RB1-2314-000CN | 2 ea. | Stop, Hinge |
| 4 | RG5-0533-000CN<br>C2001-69010<br>RG5-1077-000CN<br>C2037-69005 | LJ4<br>Exchange<br>LJ4+<br>Exchange | Display Ass'y (English) |
| 4A | RB1-2359-000CN<br>RB1-3476-000CN | LJ4<br>LJ4+ | Overlay (English) |
| | **Exchange Part Numbers** | | Overlays |
| 4A | C2001-40001<br>C2001-40002<br>C2001-40003<br>C2001-40004<br>C2001-40005<br>C2001-40006<br>C2001-40007<br>C2001-40008<br>C2001-40009<br>C2001-40010<br>C2001-40011<br>C2001-40012<br>C2001-40013<br>C2037-40014 | LJ4 | English<br>French<br>German<br>Italian<br>Spanish<br>Norwegian<br>Swedish<br>Danish<br>Finnish<br>Dutch<br>Polish<br>Turkish<br>Portugese<br>European English |

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 4A | C2037-40001<br>C2037-40002<br>C2037-40003<br>C2037-40004<br>C2037-40005<br>C2037-40006<br>C2037-40007<br>C2037-40008<br>C2037-40009<br>C2037-40010<br>C2037-40011<br>C2037-40012<br>C2037-40013<br>C2037-40014 | LJ4+ | English<br>French<br>German<br>Italian<br>Spanish<br>Norwegian<br>Swedish<br>Danish<br>Finnish<br>Dutch<br>Polish<br>Turkish<br>Portugese<br>European English |
| 5 | RG5-0478-000CN<br>RG5-1076-000CN | LJ4<br>LJ4+ | Display Ass'y (W/O overlay) |
| 6 | RB1-2260-000CN | | Brush, cleaning |
| 7 | RG5-0519-000CN<br>RG5-0982-000CN | LJ4<br>LJ4+ | Cable, Display Panel |
| 8 | XA9-0591-000CN | | Screw with Washer (M3 x 8) |

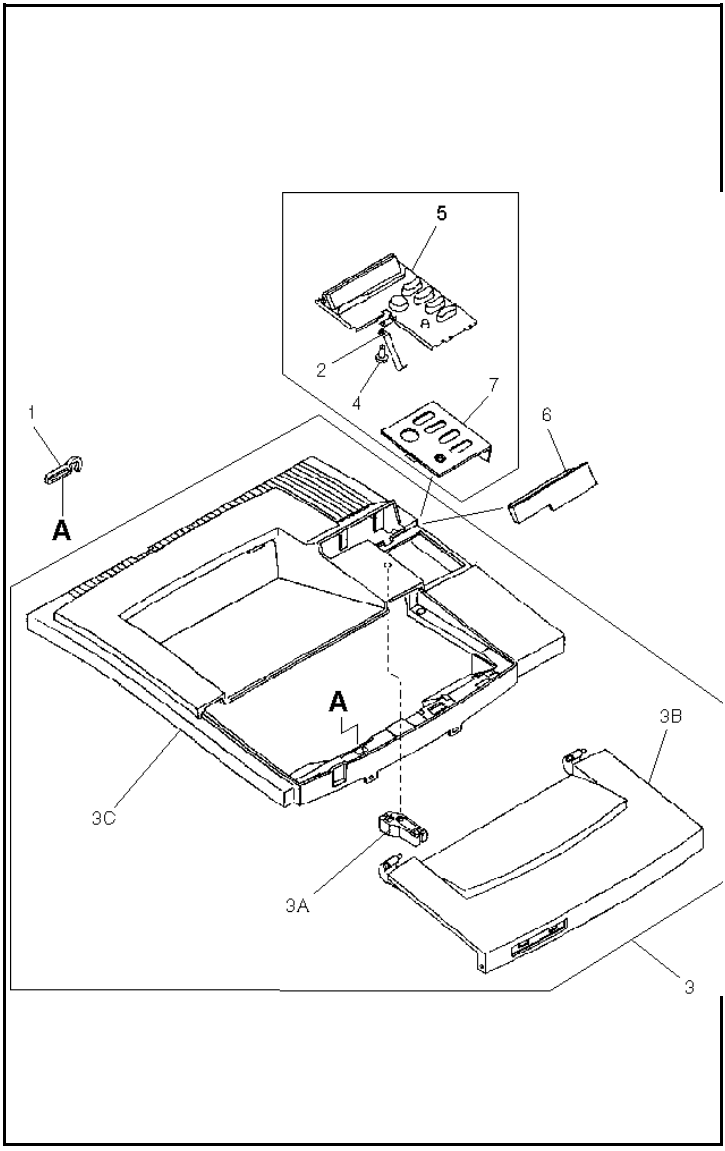


**Figure 8-3b Top Cover Assembly for LaserJet 5**

## Table 8-3b Top Cover Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-7895-000CN | | Tool, Hook |
| 2 | RB1-7893-000CN | S | Spring, Leaf |
| 3 | RG5-2186-000CN | | Upper Cover Assembly |
| 3A | RB1-7894-000CN | | Hinge Stop |
| 3B | RB1-7883-000CN | | Top Cover Door |
| 3C | RF5-1643-000CN | | Cover, Upper |
| | RG5-0982-000CN | | Cable, Control Panel (not shown) |
| 5 | RG5-2238-000CN | | Display Ass'y (W/O overlay) |
| 6 | RB1-7887-000CN | | Display Cover (part of item 3) |
| | **Part Numbers** | | Overlay Language |
| 7 | C3916-40005<br>C3916-40006<br>C3916-40007<br>C3916-40008<br>C3916-40009<br>C3916-40010<br>C3916-40011<br>C3916-40012<br>C3916-40013<br>C3916-40014<br>C3916-40015<br>C3916-40016<br>C3916-40017<br>C3916-40018<br>C3916-40019<br>C3916-40020<br>C3916-40021<br>C3916-40022<br>C3916-40023<br>C3916-40025<br>C3916-40026 | | English<br>French<br>Italian<br>German<br>Spanish<br>Norwegian<br>Danish<br>Portugese<br>Dutch<br>Finnish<br>Polish<br>Swedish<br>Traditional Chinese<br>Korean<br>Simplified Chinese<br>Turkish<br>Japanese<br>Hungarian<br>Czechoslovakian<br>Thai<br>Russian |

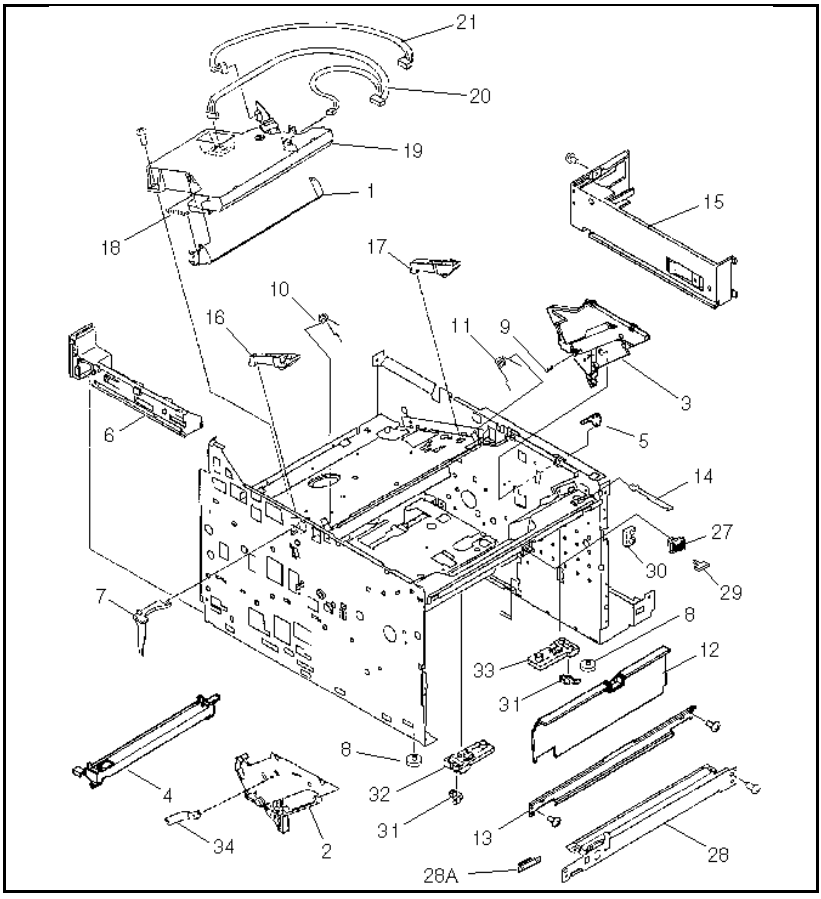


**Figure 8-4a Internal Components (1 of 4)**

**Table 8-4a** Internal Components (Section 2)

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2080-000CN | | Shutter, laser |
| 2 | RB1-2100-000CN<br>RB1-5730-000CN | LJ4/4+<br>LJ5 | Guide, Cartridge |
| 3 | RB1-2101-020CN | | Guide, Cartridge |
| 4 | RB1-2105-030CN | | Support, Cartridge |
| 5 | RB1-2106-000CN | S | Plate, grounding |
| 6 | RB1-2107-000CN<br>RB1-7913-000CN | LJ4/4+<br>LJ5 | Guide, Cassette, Left |

| | | | |
|---|---|---|---|
| 7 | RB1-2111-030CN | | Shutter, arm |
| 8 | RB1-2114-000CN | Qty 5 | Foot |
| 9 | RS5-2218-000CN | | Spring, Compression |
| 10 | RB1-2122-000CN | | Shutter Spring, Torsion |
| 11 | RB1-5732 -000CN | | Spring, Torsion |
| 12 | RB1-2141-000CN<br>RB1-7888-000CN | LJ4/4+<br>LJ5 | Cover, Inner |
| 13 | RB1-2353-000CN<br>RF5-1648-000CN | LJ4/4+<br>LJ5 | Holding Plate |
| 13A | RB1-7901-000CN | LJ5 | Mount, Tray 1 Door (not shown-part of 13) |
| 14 | RB1-2358-000CN<br>RB1-2966-000CN | LJ4/4+<br>LJ5 | Spring, Switch |
| 15 | RF5-0363-000CN<br>RF5-1079-000CN<br>RF5-1657-000CN | LJ4<br>LJ4+<br>LJ5 | Guide, Cassette, Right |
| 16 | RF5-0365-000CN<br>RB1-7917-000CN | LJ4/4+<br>LJ5 | Plate, Pressure, Left |
| 17 | RF5-0366-000CN<br>RB1-7918-000CN | LJ4/4+<br>LJ5 | Plate, Pressure, Right |
| 18 | RS5-2170-000CN | Qty 2 | Spring, Tension |
| 19 | RG5-0449-000CN<br>RG5-0903-070CN | LJ4<br>LJ4+/5 | Laser/Scanner Ass'y |
| 19 | C2001-69006<br>C2037-69008 | LJ4<br>LJ4+/5 | Laser/Scanner Ass'y (exchng) |
| 20 | RG5-0520-000CN<br>RG5-0975-000CN | LJ4<br>LJ4+/5 | Cable, D.C. Cont/Scanner |
| 21 | RG5-0556-000CN<br>RG5-0976-000CN | LJ4<br>LJ4+/5 | Cable, D.C. Cont/laser |
| 27 | RB1-2125-000CN<br>RB1-3560-000CN | LJ4<br>LJ4+ | Holder, Latch |
| 28 | RG5-0469-020CN | | Transfer Guide Ass'y |
| 28A | RB1-2237-020CN | | Static Eliminator |
| 29 | XZ9-0340-000CN<br>XZ9-0379-000CN | LJ4<br>LJ4+ | Front Door Latch |
| 30 | RB1-7908-000CN | LJ 4+/5 | Cable Clip |
| 31 | RB1-7902-000CN | LJ5 | Click, Tray 1 Door (Qty 2) |
| 32 | RB1-7903-000CN | LJ5 | Guide, Click, Left |
| 33 | RB1-7923-000CN | LJ5 | Guide, Click, Right |
| 34 | RB1-5731-000CN | LJ5 | Spring, Left Cartridge Guide |

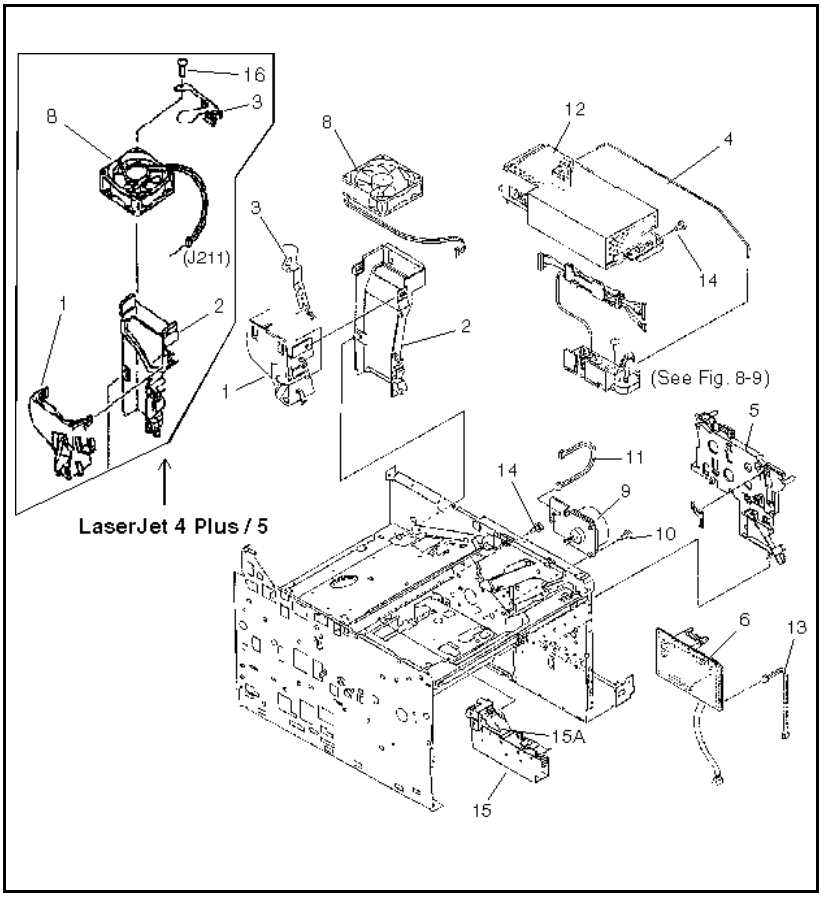


**Figure 8-4b Internal Components (2 of 4)**

## Table 8-4b Internal Components (Section 2)

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2112-000CN<br>RB1-3544-000CN | LJ4<br>LJ4+/5 | Exhaust Duct |
| 2 | RB1-2113-000CN<br>RF5-0748-000CN | LJ4<br>LJ4+/5 | Exhaust Duct Cover |
| 3 | RB1-2350-000CN<br>RB1-3547-000CN | LJ4<br>LJ4+/5 | Exhaust Fan Cover |
| 4 | RB1-2352-000CN<br>RB1-7896-000CN | LJ4/4+<br>LJ5 | Rod |
| 5 | RF5-0470-000CN<br>RF5-0743-000CN<br>RF5-1653-000CN | LJ4<br>LJ4+<br>LJ5 | Mount, DC Controller |
| 6 | RG5-0511-000CN<br>RG5-0966-030CN | LJ4<br>LJ4+/5 | DC Controller PCA |
| 6 | C2001-69002<br>C2037-69004 | LJ4<br>LJ4+/5 | DC Controller PCA (exchange) |
| 8 | RH7-1143-000CN<br>RH7-1177-000CN<br>RH7-1178-000CN | LJ4<br>LJ4+<br>LJ5 | Exhaust Fan |
| 9 | RH7-1151-000CN<br>RH7-1169-000CN | LJ4<br>LJ4+/5 | Motor, Main Drive |
| 10 | XA9-0585-000CN | 4 ea | Screw w/washer |
| 11 | RG5-0538-000CN<br>RG5-0978-000CN | LJ4<br>LJ4+/5 | Cable, Main Motor |
| 12 | RG5-0531-000CN<br>RG5-2499-000CN | LJ4<br>LJ4+/5 | Power Supply Assembly 100/115V |
| 12 | C2001-69007<br>C2037-69006 | LJ4<br>LJ4+/5 | Power Supply Assembly (exchng) 100/115V |
| 12 | RG5-0553-000CN<br>RG5-2500-000CN | LJ4<br>LJ4+/5 | Power Supply Assembly 220/240V |
| 12 | C2001-69008<br>C2037-69007 | LJ4<br>LJ4+/5 | Power Supply Assembly (exchng) 220/240V |
| 13 | RG5-0526-000CN | | Cable, Low Voltage, Fuser Drive |
| 14 | FA9-1449-000CN<br>XA9-0267-000CN | LJ4<br>(4 ea.)<br>LJ4+/5<br>(2 ea.) | Screw, w/ washer |
| 15 | RG5-0457-000CN<br>RG5-0876-050CN | LJ4<br>LJ4+/5 | Drive Gear Ass'y |
| 15A | RB1-2318-000CN<br>RB1-3481-020CN | LJ4<br>LJ4+/5 | Drive Gear Cover |
| 16 | XA9-0668-000CN | LJ4+/5 | Screw w/ washer, M3X29.5 |

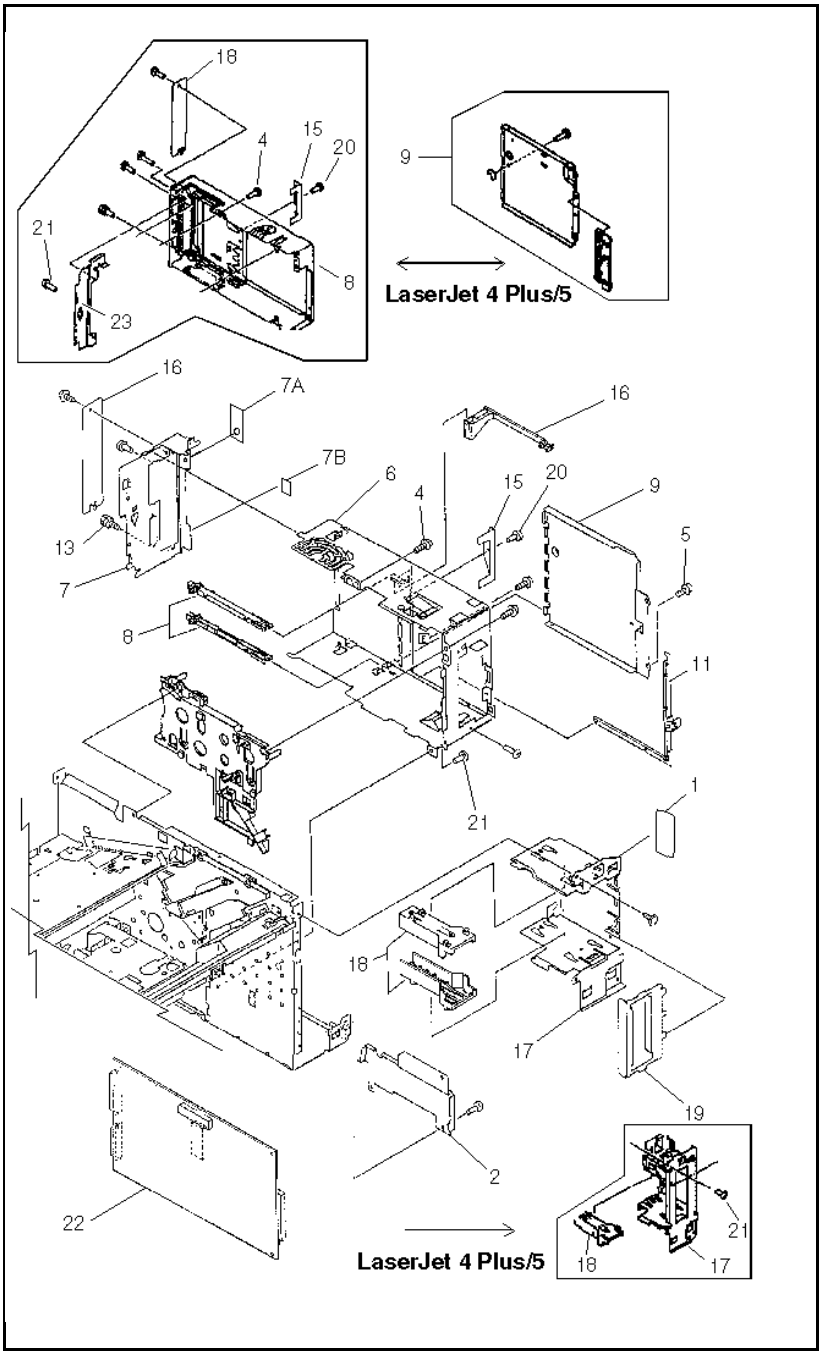


**Figure 8-4c Internal Components (3 of 4)**

## Table 8-4c Internal Components (Section 3)

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RS5-8219-000CN | S | Label |
| 2 | RB1-2357-000-CN<br>RB1-7897-000CN | LJ4/4+<br>LJ5 | Cover, Connector |
| 4 | XA9-0584-000CN<br>XA9-0670-000CN | LJ4<br>LJ4+/5 | Screw, w/ spring washer |
| 5 | XA9-0574-000CN | | Screw, 5mm hex head |
| 6 | RF5-0471-000CN<br>RF5-0746-000CN<br>RF5-1647-000CN | LJ4<br>LJ4+<br>LJ5 | Plate, Shield |
| 7 | RF5-0355-000CN | LJ4 | Panel, I/O |
| 7A | RB1-2312-000CN | LJ4 | Sheet |
| 7B | RB1-2313-000CN | LJ4 | Sheet |
| 8 | RB1-2341-000CN | S | Guide, I/O Option, (LJ4 only) |
| 9 | RB1-2343-000CN<br>RF5-0739-000CN<br>RF5-1654-000CN | LJ4<br>LJ4+<br>LJ5 | Cover, SIMM Board |
| 11 | RB1-2363-000CN | S | Cover, Edge, (LJ4 only) |
| 13 | XA9-0400-000CN<br>XA9-0704-000CN | LJ4<br>LJ4+/5 | Lock, Nut |
| 15 | RB1-2365-000CN<br>RB1-3493-000CN | LJ4<br>LJ4+/5 | Plate, PCA Holding |
| 16 | RB1-2366-000CN | S | Cover, Option board |
| 17 | RB1-2366-000CN<br>RB1-3496-000CN<br>RB1-7898-000CN | LJ4<br>LJ4+<br>LJ5 | Shield, Font Cover<br><br>Shield, Cover |
| 18 | RB1-2337-000CN<br>RB1-3497-000CN | LJ4<br>LJ4+ | Guide, Font Cartridge |
| 19 | RB1-2338-000CN | S | Plate, Shield, (LJ4 only) |
| 20 | XB6-7300-409CN<br>XA9-0670-000CN | LJ4<br>LJ4+/5 | Screw, M3x4<br>Screw, M3x6 |
| 21 | XA9-0617-000CN<br>XA9-0267-000CN | LJ4<br>LJ4+/5 | Screw, M3x6 |

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 22 | C2002-67901<br>C2038-60004<br>C3919-67901 | LJ4<br>LJ4+<br>LJ5 | Formatter PCA |
| 22 | C2002-69001<br>C2038-69004<br>C3919-69001 | LJ4<br>LJ4+<br>LJ5 | Formatter PCA (Exchange) |
| 23 | RB1-3494-000CN<br>RB1-7892-000CN | LJ4+<br>LJ5 | Plate, Reinforcement |

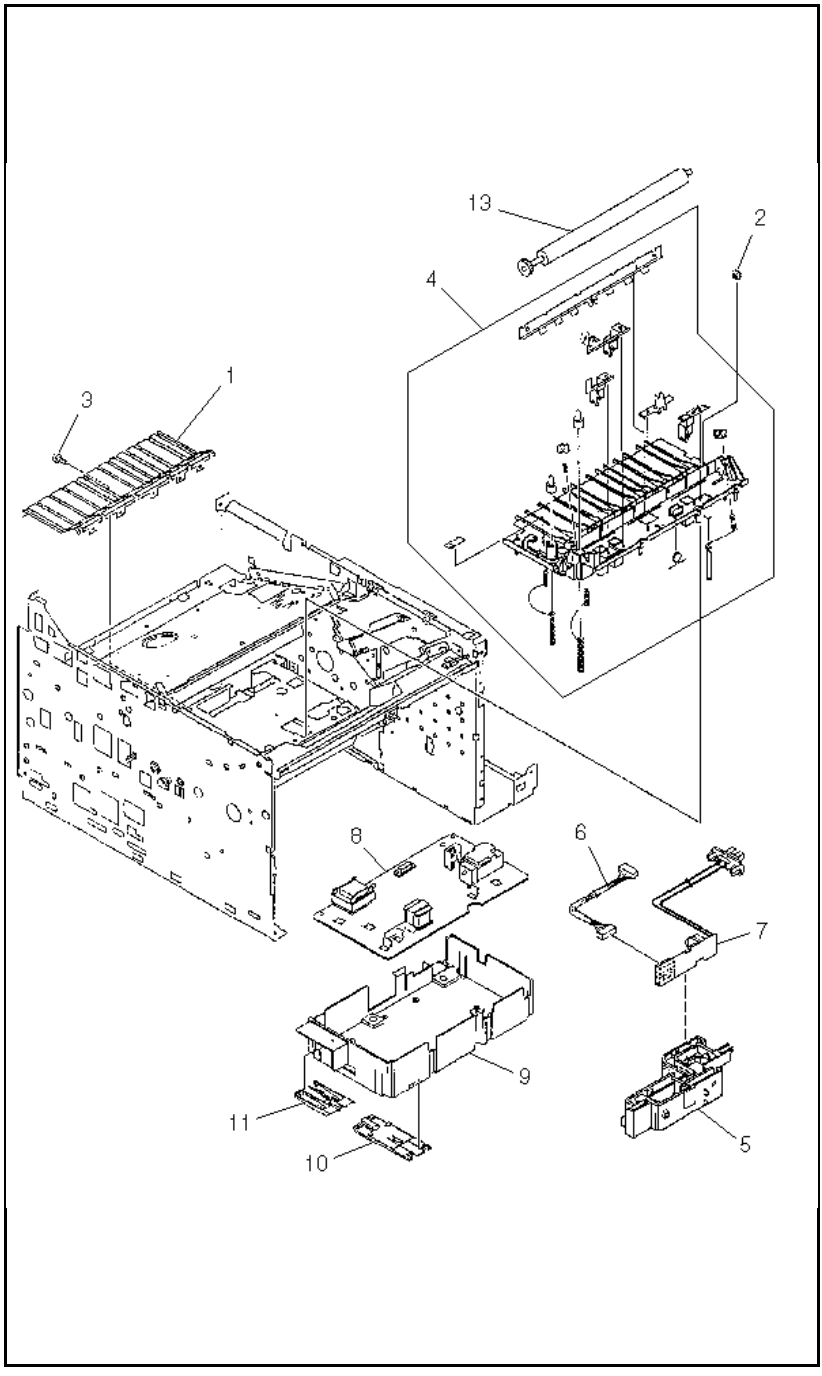


**Figure 8-4d Internal Components (4 of 4)**

## Table 8-4d Internal Components (Section 4)

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2236-000CN | | Guide, Feeder |
| 2 | RB1-2253-000CN | | Roller, Guides (6) |
| 3 | XA9-0623-000CN | | Hex Head Screw |
| 4 | RG5-0468-000CN<br>RG5-2192-000CN | LJ4/4+<br>LJ5 | Transfer Block Ass'y |
| 5 | RB1-2251-000CN | | Block, Connecting |
| 6 | RG5-0521-000CN<br>RG5-0979-000CN | LJ4<br>LJ4+/5 | Cable, D.C. Controller /Interconnect PCA |
| 7 | RG5-0515-000CN | | Connector PCA Ass'y |
| 8 | RG5-0513-000CN<br>RG5-0969-040CN | LJ4<br>LJ4+/5 | High Voltage PCA |
| 8 | C2001-69009<br>C2037-69009 | LJ4<br>LJ4+/5 | High Voltage PCA (exchng) |
| 9 | RB1-2226-000CN | | Cover, High Voltage |
| 10 | RF5-0369-040CN | | Holder, Paper, Front |
| 11 | RB1-2259-040CN | | Holder, Paper, Rear |
| 13 | RF5-0349-000CN | | Roller, Transfer |

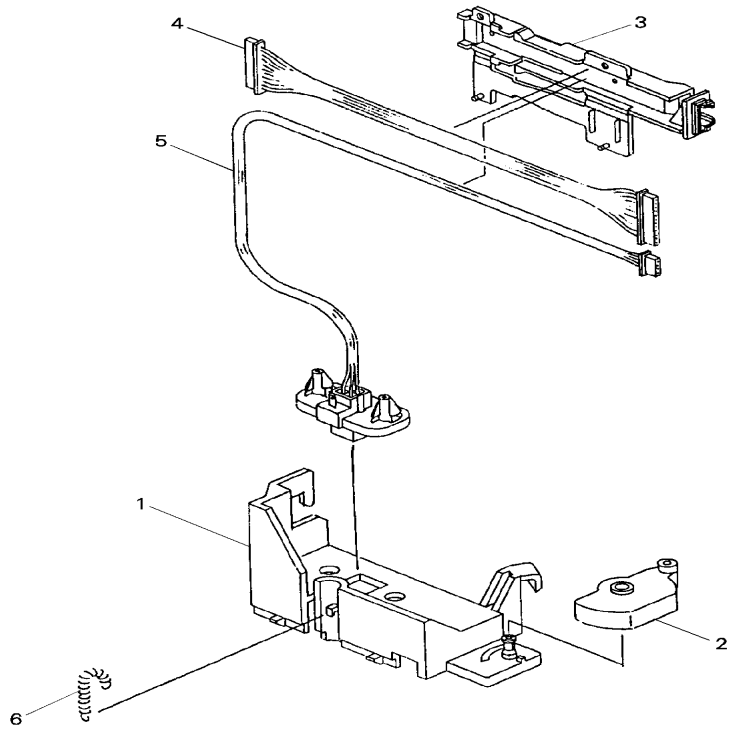


**Figure 8-5 Main Switch Assembly**

## Table 8-5 Main Switch Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RB1-2118-000CN<br>RB1-7906-000CN | LJ4/4+<br>LJ5<br>S | Base, Switch Mounting |
| 2 | RB1-2119-000CN<br>RB1-7907-000CN | LJ4/4+<br>LJ5<br>S | Switch |
| 3 | RB1-2345-000CN | S | Cover (LJ4/4+ only) |
| 4 | RG5-0524-000CN | J201/<br>J601 | Cable, Paper Control PCA/<br>DC Controller |
| 5 | RG5-0530-000CN | J603/<br>J135 | Cable, Lower Feed Assembly |

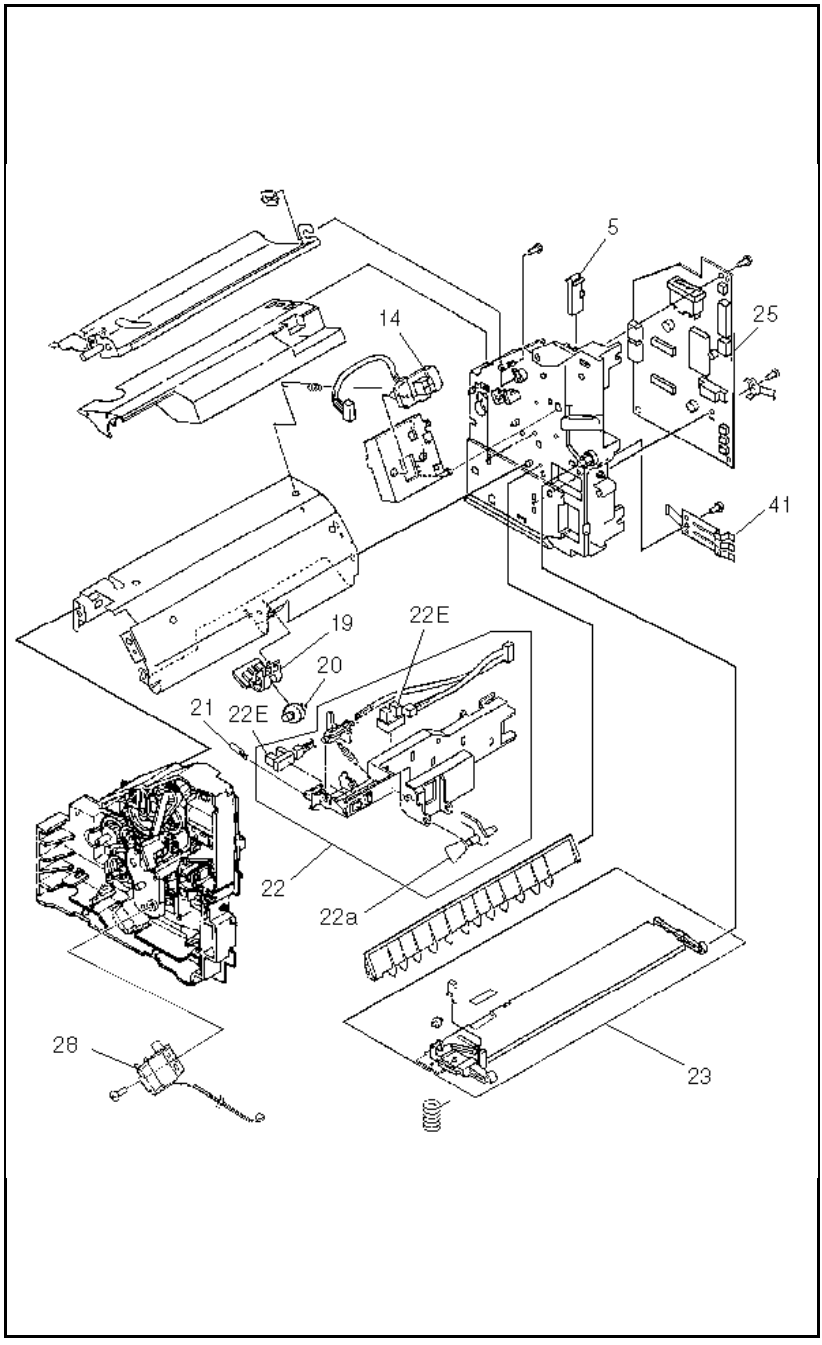


**Figure 8-6a Paper Feed Assembly (1 of 2)**

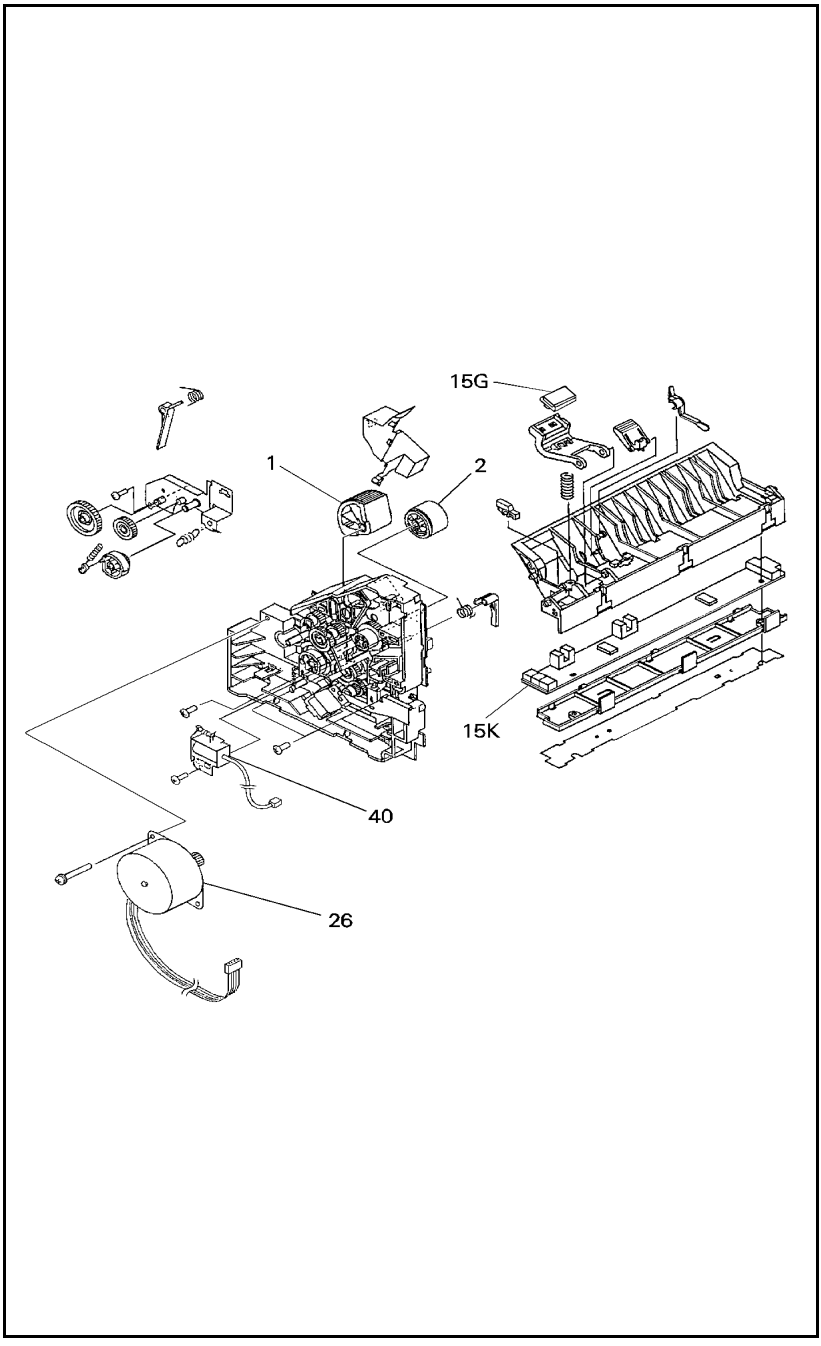


**Figure 8-6b Paper Feed Assembly (2 of 2)**

## Table 8-6 Paper Feed Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | RG5-0451-000CN<br>RG5-0877-000CN<br>RG5-2195-000CN | LJ4<br>LJ4+<br>LJ5 | Paper Feed Assembly |
| | C2001-69005<br>C2037-69003<br>C3916-69005 | LJ4<br>LJ4+<br>LJ5 | Paper Feed Ass'y (exchng) |
| 1 | RB1-2126-000CN<br>RB1-3477-000CN<br>RB1-7911-000CN | LJ4<br>LJ4+<br>LJ5 | Roller, Pickup, PC Tray<br><br>Roller, Pickup, Tray 2 |
| 2 | RB1-2127-000CN<br>RB1-2205-000CN | LJ4/4+<br>LJ5 | Roller, MP Tray Pickup<br>Roller, Tray 1 Pickup |
| 5 | RB1-2138-000CN | | Lever, Switch |
| 14 | RG5-0529-000CN | | Cable, Env. Feeder |
| 15G | RF5-0343-000CN | | Pad, Separation |
| 15K | RG5-0514-000CN | | PCA, Sensor (PS4, PS5) |
| 19 | RB1-2181-000CN | | Holder, Guide Roller |
| 20 | RB1-2182-000CN | | Roller, Guide |
| 21 | RB1-2179-000CN | | Pin, Sensor Holder |
| 22 | RG5-0466-000CN | | Assembly, Sensor Holder |
| 22A | RB1-2133-000CN | | Paper Sensor Flag |
| 22E | WG8-0291-000CN | Qty 2 | Photo-Sensor (PS1, PS2) |
| 23 | RG5-0467-060CN | | Assembly, MP Tray (Tray 1) Base |
| 25 | RG5-0512-070CN | | Paper Control PCA |
| 26 | RH7-1136-000CN<br>RH7-1197-000CN | LJ4<br>LJ4+/5 | Motor, Paper Pickup |
| 28 | RH7-5070-000CN<br>RH7-5071-000CN | LJ4<br>LJ4+/5 | PC (Tray 2) Pickup Solenoid (SL1) |
| 40 | RH7-5074-000CN<br>RH7-5075-000CN | LJ4<br>LJ4+/5 | MP (Tray 1) Pickup Solenoid (SL2) |
| 41 | RB1-2139-030CN | | Paper Sensor Leaf Spring |

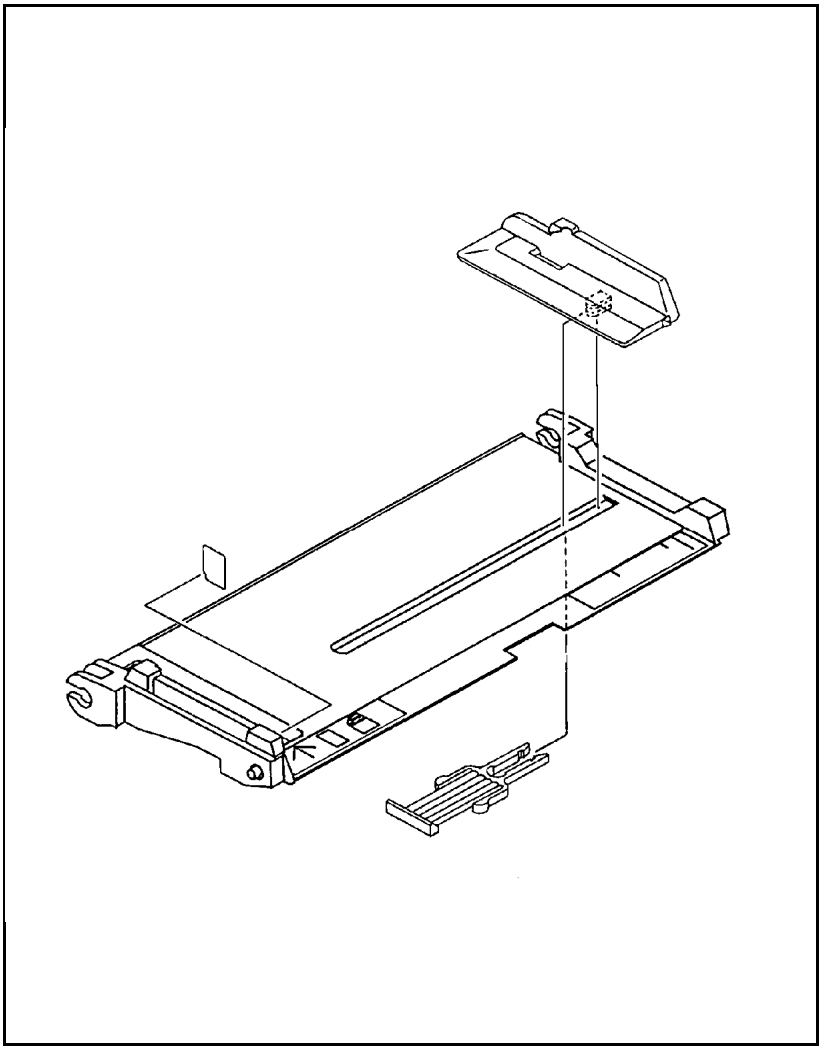

**Figure 8-7 MP Tray (Tray 1) Assembly**

**Table 8-7** MP Tray (Tray 1) Assembly

| Part # | Notes | Description |
|---|---|---|
| RG5-0472-000CN | LJ4 | Multi-Purpose Tray Assembly |
| RG5-0888-000CN | LJ4+ | |
| RG5-2199-000CN | LJ5 | Tray 1 Assembly |

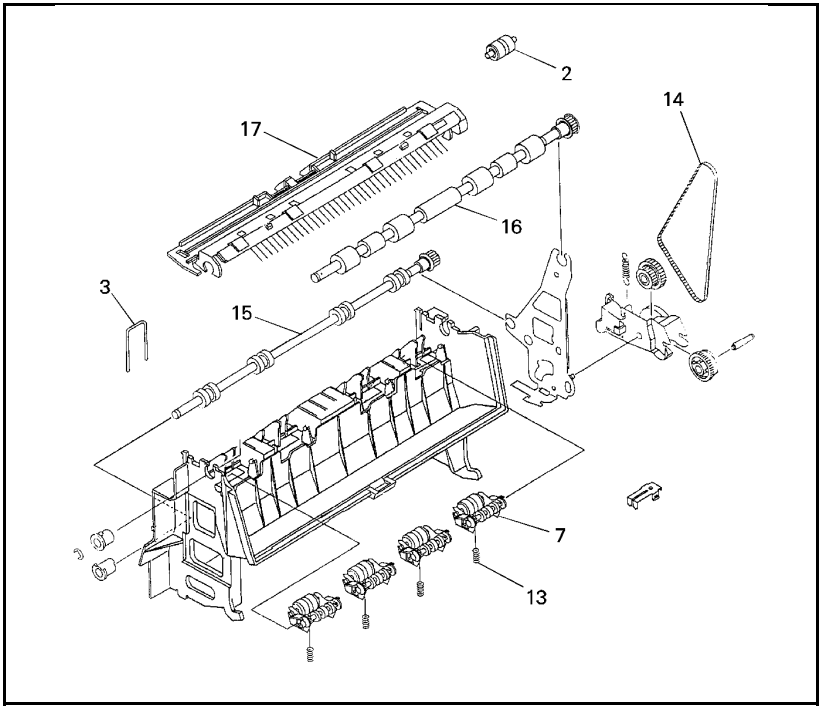


**Figure 8-8 Paper Output Assembly**

**Table 8-8** Paper Output Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | RG5-0456-000CN<br>RG5-0886-000CN<br>RG5-2189-000CN | LJ4<br>LJ4+<br>LJ5 | Paper Output Assembly |
| 2 | RB1-2299-030CN | 4 ea. | Rollers, Delivery |
| 3 | RB1-2302-000CN | 4 ea. | Spring, Roller |
| 7 | RF5-0425-040CN | 4 ea. | Holder, Roller |
| 13 | RS5-2185-000CN<br>RS5-2267-000CN | LJ4<br>LJ4+/5<br>4 ea. | Spring, Compression |
| 14 | XF9-0410-000CN | | Belt, Timing |
| 15 | RF5-0438-000CN<br>RF5-1077-030CN | LJ4<br>LJ4+/5 | Roller, Lower Delivery |
| 16 | RF5-0534-000CN<br>RF5-1076-020CN | LJ4<br>LJ4+/5 | Roller, Upper Delivery |
| 17 | RF5-0532-000CN<br>RF5-0647-000CN | LJ4/4+<br>LJ5 | Upper Guide, Delivery |

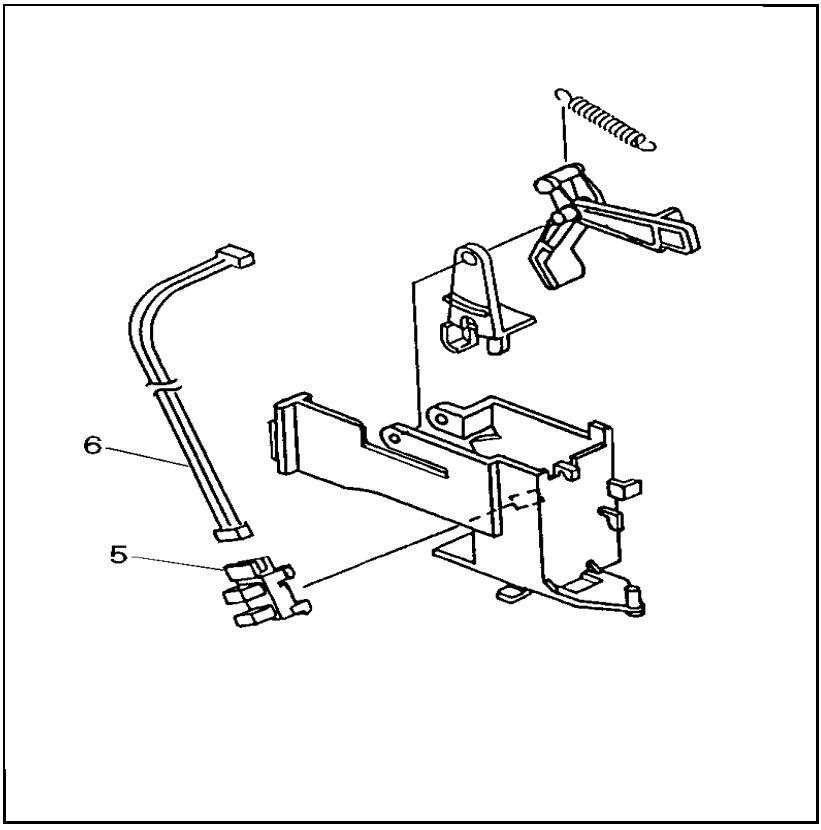


**Figure 8-9 Delivery Sensor Assembly**

**Table 8-9** Delivery Sensor Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | RG5-0475-060CN | | Assembly, Delivery Sensor |
| 5 | WG8-0291-000CN | | Photosensor, (PS3) |
| 6 | RG5-0522-000CN<br>RG5-0980-000CN | LJ4<br>LJ4+/5 | Cable, Delivery Sensor |

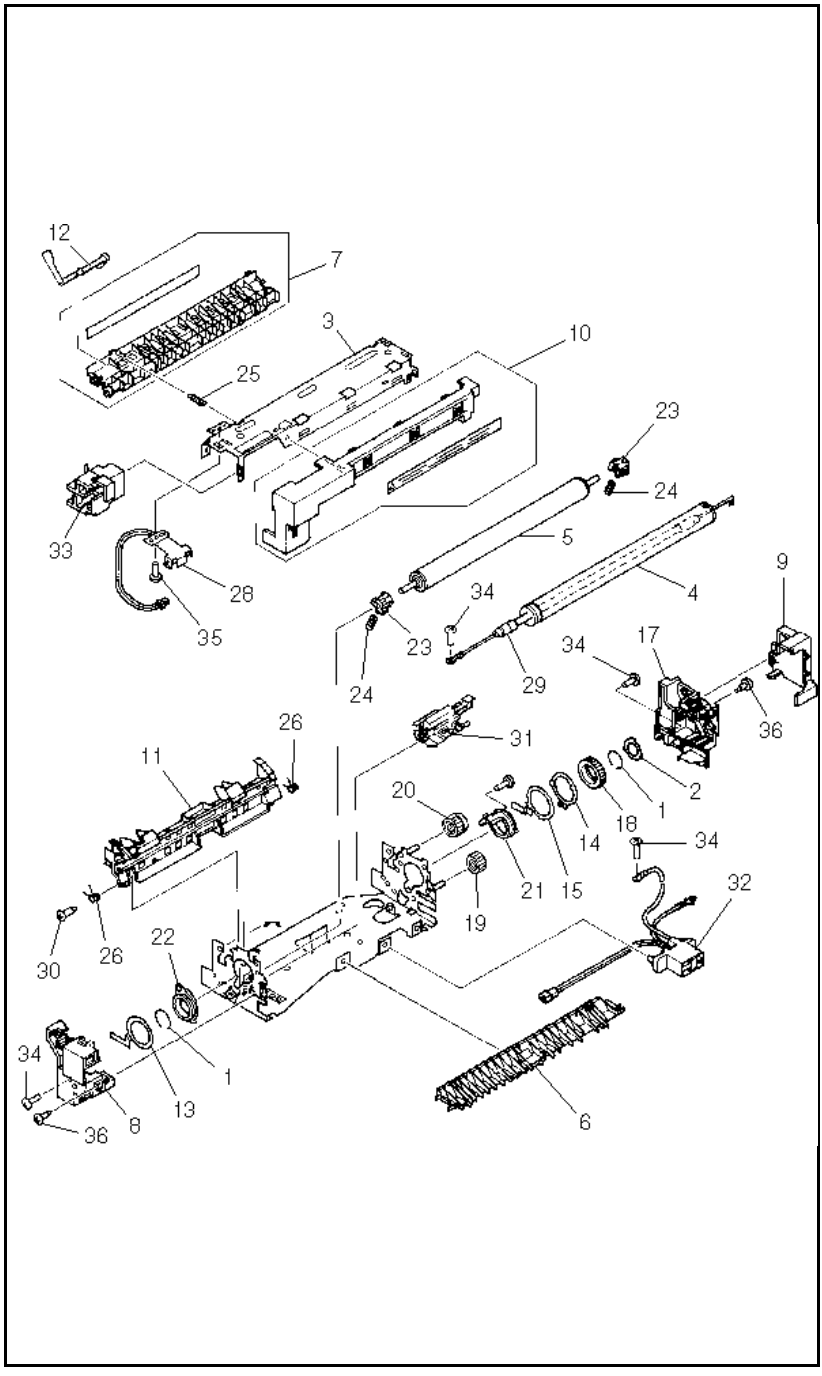


**Figure 8-10 Fuser Assembly**

## Table 8-10 Fuser Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | RG5-0454-000CN<br>RG5-0879-130CN | LJ4<br>LJ4+/5 | Fuser Assembly 110/115V |
| | C2001-69003<br>C2037-69001 | LJ4<br>LJ4+/5 | Fuser Assembly (Exchange) 110/115V |
| | RG5-0455-000CN<br>RG5-0880-130CN | LJ4<br>LJ4+/5 | Fuser Assembly 220/240V |
| | C2001-69004<br>C2037-69002 | LJ4<br>LJ4+/5 | Fuser Assembly (Exchange) 220/240V |
| 1 | RA1-7584-000CN<br>RB1-0253-000CN | LJ4<br>LJ4+/5<br>S | Ring, Roller (2 ea.) |
| 2 | RB1-2287-000CN | S | Washer, Grounding (LJ4 only) |
| 3 | RB1-3515-000CN | | Upper Frame |
| 4 | RB1-2263-000CN<br>RB1-3516-020CN | LJ4<br>LJ4+/5 | Roller, Upper |
| 5 | RB1-2264-000CN<br>RB1-3517-030CN | LJ4<br>LJ4+/5 | Roller, Lower |
| 6 | RB1-2265-000CN<br>RB1-3518-000CN | LJ4<br>LJ4+/5<br>S | Guide, Paper Entrance |
| 7 | RF5-0536-000CN<br>RF5-0744-000CN | LJ4<br>LJ4+/5<br>S | Guide, Separation |
| 8 | RF5-0428-000CN<br>RF5-0737-000CN | LJ4<br>LJ 4+/5 | Cover, Left |
| 9 | RB1-2270-000CN | S | Cover (LJ4 only) |
| 10 | RF5-0535-000CN<br>RF5-0738-000CN | LJ4<br>LJ4+/5<br>S | Cover, Wire |
| 11 | RB1-2272-000CN<br>RB1-3526-000CN | LJ4<br>LJ4+/5<br>S | Guide, Lower Separation |
| 12 | RB1-2273-000CN<br>RB1-3522-000CN | LJ4<br>LJ4+/5 | Lever, Sensor |
| 13 | RB1-2274-000CN<br>RB1-3528-000CN | LJ4<br>LJ4+ | Lever, Release-Left |
| | RB1-3528-000CN | LJ4+/5 | Washer, Grounding |
| 14 | RB1-2284-000CN | LJ4/4+ | Clamp, Plate Release |
| 15 | RB1-2285-000CN<br>RB1-3527-000CN | LJ4<br>LJ4+<br>S | Lever, Release |
| 17 | RF5-0427-000CN<br>RF5-0736-000CN | LJ4<br>LJ4+/5<br>S | Cover, Right |

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 20 | RS5-0232-000CN<br>RS5-0393-000CN | LJ4<br>LJ4+/5<br>S | Gear, 23T |
| 21 | RS5-1063-000CN<br>RS5-1097-020CN | LJ4<br>LJ4+/5 | Bushing, Roller |
| 22 | RS5-1064-000CN<br>RS5-1098-000CN | LJ4<br>LJ4+/5<br>S | Bushing, Roller |
| 23 | RS5-1065-000CN<br>RS5-1099-000CN | LJ4<br>LJ4+/5<br>S | Bushing, Lower Roller (2) |
| 24 | RS5-2168-000CN<br>RS5-2265-020CN | LJ4<br>LJ4+/5 | Spring, Compression (2) |
| 25 | RS5-2180-000CN | S | Spring, Tension |
| 26 | RB1-2286-000CN | S | Spring, Guide |
| 28 | RH7-7045-000CN<br>RH7-7054-000CN | LJ4<br>LJ4+/5<br>S | Thermistor |
| 29 | RH7-4046-000CN<br>RH7-4054-020CN | LJ4<br>LJ4+/5 | Heater, Halogen, 100/115V |
| 29 | RH7-4048-000CN<br>RH7-4055-020CN | LJ4<br>LJ4+/5 | Heater, Halogen, 220/240V |
| 30 | RS5-9055-000CN | S | Screw, Shoulder (M3) |
| 31 | RG5-0474-000CN<br>RG5-0881-000CN | LJ4<br>LJ4+/5 | Thermoswitch Ass'y |
| 32 | RG5-0537-000CN<br>RG5-0977-000CN | LJ4<br>LJ4+/5<br>J743/J744 | Cable, Fuser |
| 33 | RB1-2289-000CN<br>RG5-0737-000CN | LJ4<br>LJ4+<br>S | Cover, Heater |
| 34 | XB2-8300-607CN<br>XA9-0702-000CN | LJ4<br>LJ4+/5<br>S | Screw, M3x6 (4) |
| 35 | XB6-7300-409CN<br>XA9-0678-000CN | LJ4<br>LJ4+/5<br>S | Screw, M3x4<br>Screw, M3x3 |
| 36 | RF5-0716-000CN | S | Screw, Shoulder w/washer (M3) (Qty 2) |

# Accessory Parts

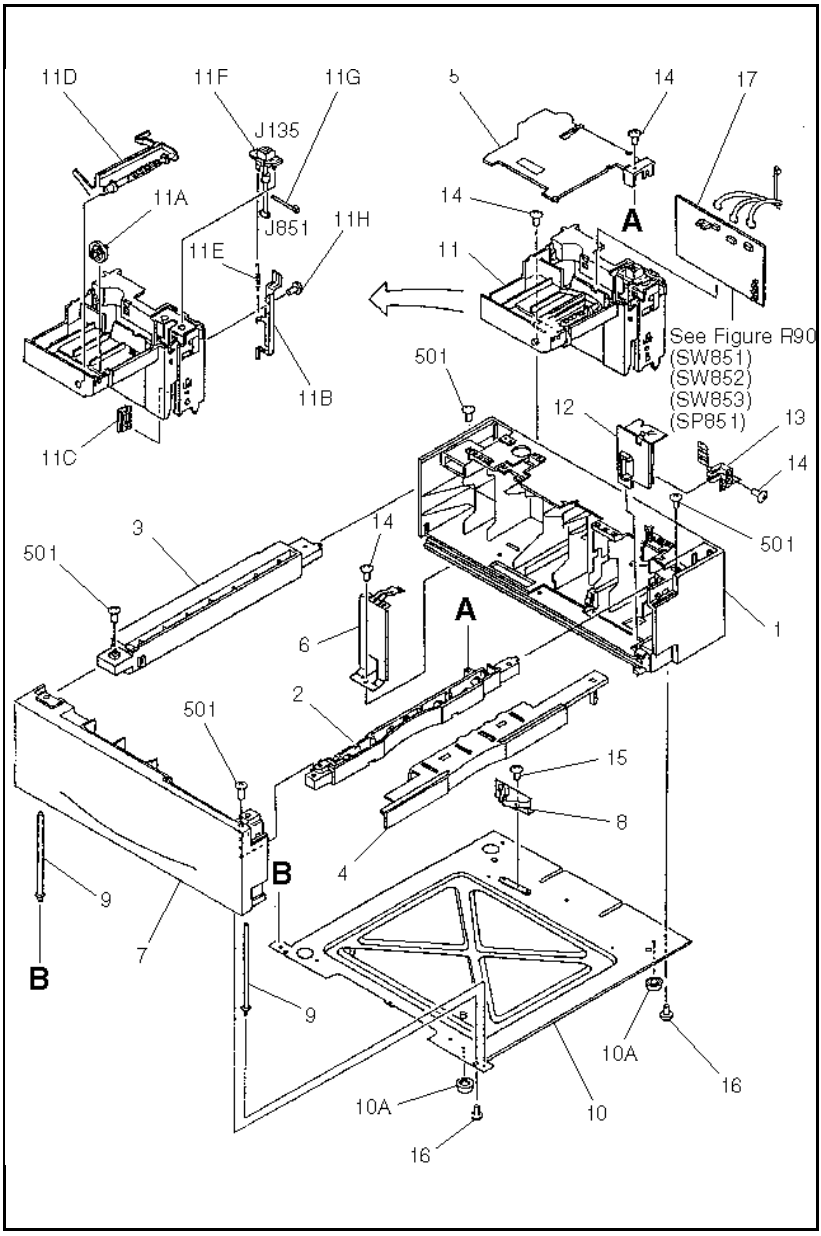


Figure 8-11 Lower Cassette Base Assembly

## Table 8-11 Lower Cassette Base Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | C2083A | LJ4 | LC Base Assembly w/non-Legal Cassette |
| | C2083B<br>C2083D<br>C3921A | LJ4<br>LJ/4+<br>LJ5 | LC Base Assembly with Legal Universal Cassette<br>Tray 3 |
| 4 | RB1-2606-000CN<br>RB1-7977-000CN | LJ4/4+<br>LJ5 | Cover, Front |
| 5 | RB1-2628-000CN | S | Cover |
| 6 | RB1-2647-000CN | S | Plate, Grounding |
| 8 | RF5-0374-000CN | S | Click, Spring |
| 9 | RF5-0375-000CN | S | Shaft |
| 10 | RG5-0482-000CN<br>RG5-2207-000CN | LJ4/4+<br>LJ5 | Frame, Lower Assembly |
| 10A | RB1-2620-000CN | | Foot, Rubber (Qty 2) |
| 11 | RG5-0483-020CN | | Mount, Cover Assembly |
| 11A | RB1-2616-000CN | | Roller, Guide |
| 11D | RB1-2615-000CN | S | Arm, Sensor |
| 11F | RG1-0542-020CN | | Cable, Paper Feed |
| 12 | RG5-0487-000CN<br>RB1-2609-000CN<br>RB1-7978-000CN | LJ4<br>LJ4+<br>LJ5<br>S | Inner Cover Ass'y |
| 14 | XA9-0591-000CN | | Screw (M3 x 8) (Qty 4) |
| 17 | RG5-0541-000CN<br>RG5-1086-000CN | LJ4<br>LJ4+/5 | Lower Cassette Drive PCA |

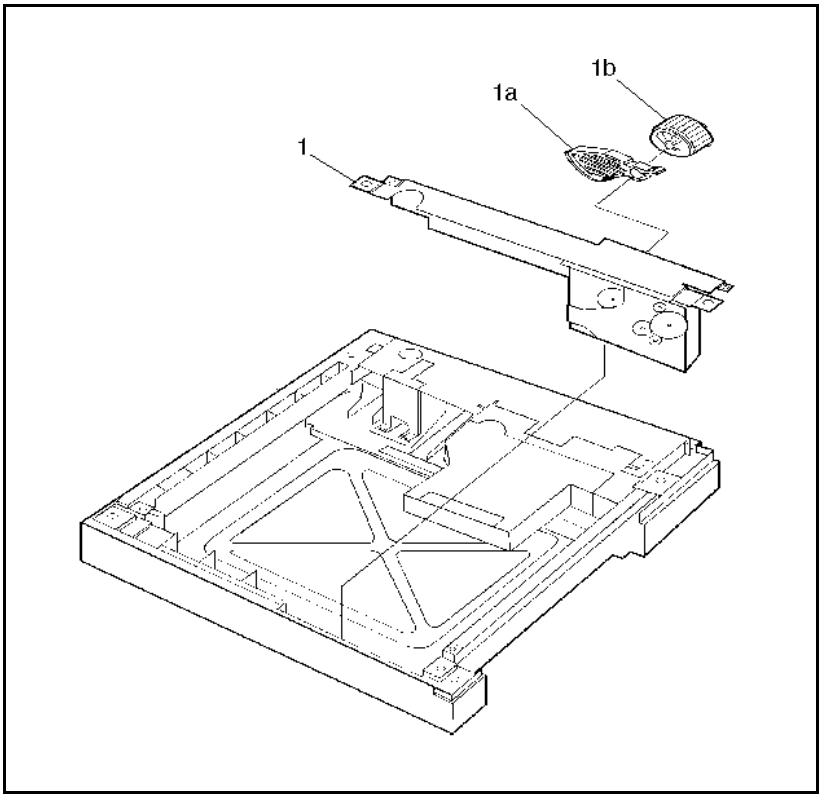


**Figure 8-12 Lower Cassette Drive Assembly**

**Table 8-12** Lower Cassette Drive Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RG5-0481-000CN<br>RG5-1099-000CN<br>RG5-2209-000CN | LJ4<br>LJ4+<br>LJ5 | Drive Assembly, Lower Cassette<br><br>Drive Assembly, Tray 3 |
| 1a | RB1-2627-020CN | | Weight |
| 1b | RB1-2632-000CN<br>RB1-2650-000CN<br>RB1-7983-000CN | LJ4<br>LJ4+<br>LJ5 | Roller, Pickup |

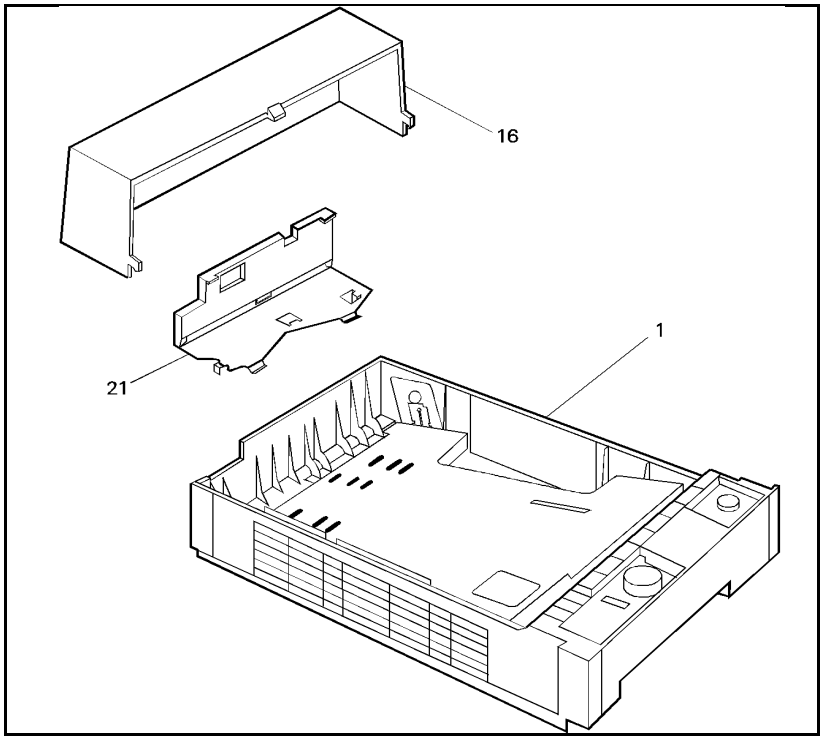


**Figure 8-13 Lower Cassette Assembly**

**Table 8-13** Lower Cassette Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | C2084A<br>C2084C | LJ4<br>LJ4\4+ | Universal 500 sheet Lower Cassette Tray (non-Legal) |
| 1 | C2084B<br>C2084D<br>C3923A | LJ4<br>LJ4/4+<br>LJ5 | Universal 500 sheet Lower Cassette Tray (Legal) |
| 16 | RB1-2645-000CN<br>RB1-8009-000CN | LJ4/4+<br>LJ5 | Cover, Rear Cassette |
| 21 | RF5-0446-000CN<br>RF5-1675-000CN | LJ4/4+<br>LJ5 | Plate, End |

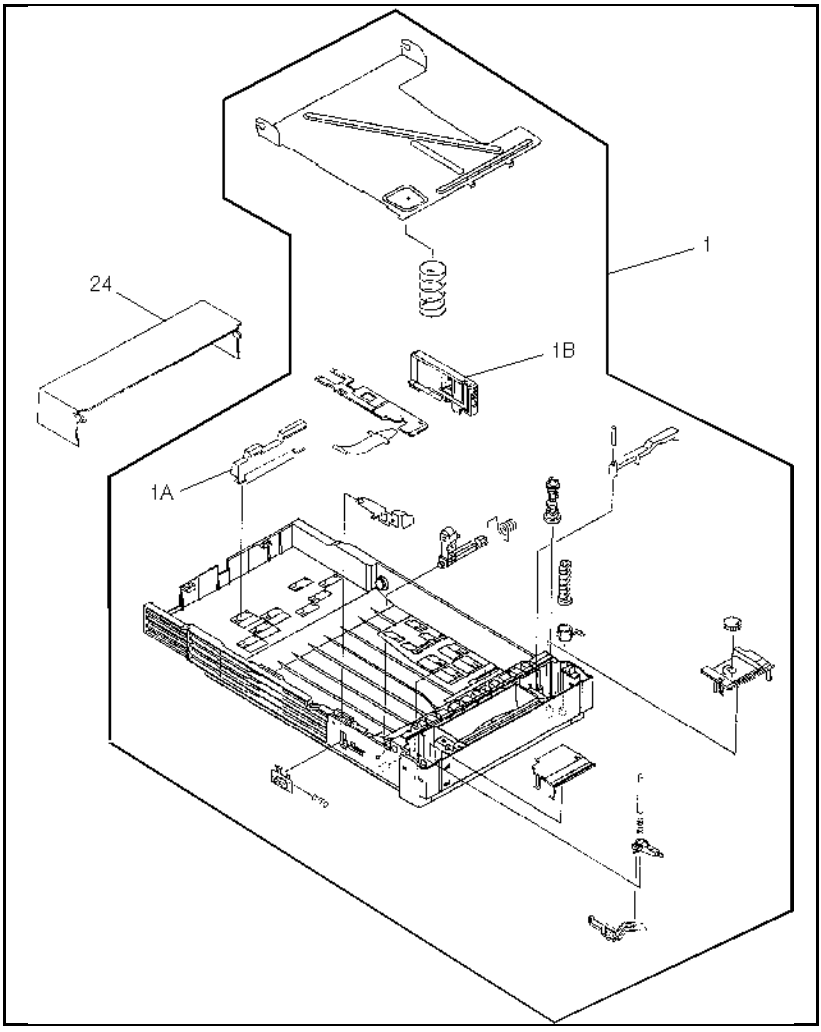


**Figure 8-14 Universal Cassette**

## Table 8-14 Universal Cassette

| Ref | Part # | Notes | Description |
|---|---|---|---|
| | C2085A<br>C2085D<br>C3924A | LJ4<br>LJ4+<br>LJ5 | 250 sheet Universal Tray (Legal, Letter, Exec, A4) |
| | C2085B<br>C2085E<br>C3925A | LJ4<br>LJ4+<br>LJ5 | 250 sheet PC Tray (letter) |
| | C2085C<br>C2085F<br>C3926A | LJ4<br>LJ4+<br>LJ5 | 250 sheet PC Tray (A4) |
| 2 | RB1-2370-020CN | | Plate, Length Adjustment (part of tray assy) |
| 21 | RF5-0430-000CN | | Plate (part of tray assy) |
| 24 | RB1-2391-000CN<br>RB1-7969-000CN | LJ4/4+<br>LJ5 | Cover, Legal |

### SIMM Memory

## Table 8-15 Simm Modules

| Part # | Notes | Size | Type |
|---|---|---|---|
| C2063A<br>C3130A** (C3130-60001) | LJ4<br>LJ4+/5 | 1 MByte | 80nS RAM |
| C2064A<br>C3131A** (C3131-60001) | LJ4<br>LJ4+/5 | 2 MBytes | 80nS RAM |
| C2065A<br>C3132A** (C3132-60001) | LJ4<br>LJ4+/5 | 4 MBytes | 80nS RAM |
| C2066A<br>C3133A** (C3133-60001) | LJ4<br>LJ4+/5 | 8 MBytes | 80nS RAM |
| C3146A** | LJ4+/5 | 16 MBytes | |
| C2080A<br>C3129A<br>C3918A | LJ4<br>LJ4+<br>LJ5 | | PostScript Level 2 Emulation SIMM |
| C2080-69001<br>C3129-69001<br>C3918-69001 | LJ4<br>LJ4+<br>LJ5 | | PostScript SIMM Package, Replacement Only |
| C2081A<br>N/A | LJ4<br>LJ4+/5 | | IBM/Epson Emulation SIMM |

**This memory will NOT operate in the LaserJet 4

## Miscellaneous Parts and Accessories

**Table 8-16** Miscellaneous Parts and Accessories

| Part # | Notes | Description |
|---|---|---|
| 92298A | | Toner Cartridge |
| J2341A<br>J2552A (J2552-69001) | LJ4<br>LJ4+/5 | AppleTalk MIO Interface |
| J2550A (J2550-69001) | LJ5 | 10-BaseT MIO Interface |
| C2082B<br>C3927A | LJ4/4+<br>LJ5 | Envelope Feeder (new) |
| C2082-69001<br>C3927-69001 | LJ4/4+<br>LJ5 | Envelope Feeder (exchange) |
| C2809A | LJ4+/5 | 9-25 Pin Adaptor |
| C2929A | LJ5 | Infrared Transceiver Pod |

# Parts List

**Table 8-17** Alphanumeric Parts List

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| 10-BaseT MIO Interface | J2550A (J2550-69001) | | 5 |
| 16 Mbytes | C3146A | | 4+/5 |
| 250 Sheet PC Tray (A4) | C2085C | 8-14 | 4 |
| 250 Sheet PC Tray (A4) | C2085F | 8-14 | 4+ |
| 250 Sheet PC Tray (A4) | C3926A | 8-14 | 5 |
| 250 Sheet PC Tray (letter) | C2085B | 8-14 | 4 |
| 250 Sheet PC Tray (letter) | C2085E | 8-14 | 4+ |
| 250 Sheet PC Tray (letter) | C3925A | 8-14 | 5 |
| 250 Sheet Univ. Tray (Legal, letter, exec, A4) | C2085A | 8-14 | 4 |
| 250 Sheet Univ. Tray (Legal, letter, exec, A4) | C2085D | 8-14 | 4+ |
| 250 Sheet Univ. Tray (Legal, letter, exec, A4) | C3924A | 8-14 | 5 |
| 80nS RAM, 1 Mbytes | C2063A | | 4 |
| 80nS RAM, 1 Mbytes | C3130A (C3130-60001) | | 4+/5 |
| 80nS RAM, 2 Mbytes | C2064A | | 4 |
| 80nS RAM, 2 Mbytes | C3131A (C3131-60001) | | 4+/5 |
| 80nS RAM, 4 Mbytes | C2065A | | 4 |
| 80nS RAM, 4 Mbytes | C3132A (C3132-60001) | | 4+/5 |
| 80nS RAM, 8 Mbytes | C2066A | | 4 |
| 80nS RAM, 8 Mbytes | C3133A (C3133-60001) | | 4+/5 |
| 9-25 Pin Adaptor | C2809A | | 4+/5 |
| AppleTalk MIO Interface | J2341A | | 4 |
| AppleTalk MIO Interface | J2552A (J2552-69001) | | 4+/5 |
| Arm, Sensor | RB1-2615-000CN | 8-11 | 4/4+/5 |
| Assembly, Delivery Sensor | RG5-0475-000CN | | 4/4+/5 |
| Assembly, MP (Tray 1) Tray Base | RG5-0467-060CN | 8-6a | 4/4+/5 |
| Assembly, Sensor Holder | RG5-0466-000CN | 8-6a | 4/4+/5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Base, Switch Mounting | RB1-2118-000CN | 8-5 | 4/4+ |
| Base, Switch Mounting | RB1-7906-000CN | 8-5 | 5 |
| Belt, Timing | XF9-0410-000CN | 8-8 | 4/4+/5 |
| Block, Connecting | RB1-2251-000CN | 8-4d | 4/4+/5 |
| Brush, cleaning | RB1-2260-000CN | 8-3a | 4/4+ |
| Bushing, Lower Roller (2) | RS5-1065-000CN | 8-10 | 4 |
| Bushing, Lower Roller (2) | RS5-1099-000CN | 8-10 | 4+/5 |
| Bushing, Roller | RS5-1063-000CN | 8-10 | 4 |
| Bushing, Roller | RS5-1064-000CN | 8-10 | 4 |
| Bushing, Roller | RS5-1097-020CN | 8-10 | 4+/5 |
| Bushing, Roller | RS5-1098-000CN | 8-10 | 4+/5 |
| Cable Clip | RB1-7908-000CN | 8-4a | 4+/5 |
| Cable Paper Control PCA/DC Controller | RG5-0524-000CN | 8-5 | 4/4+/5 |
| Cable, D.C. Cont/Laser | RG5-0556-000CN | 8-4a | 4 |
| Cable, D.C. Cont/Laser | RG5-0976-000CN | 8-4a | 4+/5 |
| Cable, D.C. Cont/Scanner | RG5-0520-000CN | 8-4a | 4 |
| Cable, D.C. Cont/Scanner | RG5-0975-000CN | 8-4a | 4+/5 |
| Cable, D.C. Controller/Interconnect PCA | RG5-0521-000CN | 8-4d | 4 |
| Cable, D.C. Controller/Interconnect PCA | RG5-0979-000CN | 8-4d | 4+/5 |
| Cable, Delivery Sensor | RG5-0522-000CN | 8-9 | 4 |
| Cable, Delivery Sensor | RG5-0980-000CN | 8-9 | 4+/5 |
| Cable, Display Panel | RG5-0519-000CN | 8-3a | 4 |
| Cable, Display Panel | RG5-0982-000CN | 8-3a | 4+ |
| Cable, Env. Feeder (J604/J136) | RG5-0529-000CN | 8-6a | 4/4+/5 |
| Cable, Fuser (J743/J744) | RG5-0537-000CN | 8-10 | 4 |
| Cable, Fuser (J743/J744) | RG5-0977-000CN | 8-10 | 4+/5 |
| Cable, Low Voltage, Fuser Drive | RG5-0526-000CN | 8-4b | 4/4+/5 |
| Cable, Lower Feed Assembly (J603/J135) | RG5-0530-000CN | 8-5 | 4/4Plus/5 |
| Cable, Main Motor | RG5-0538-000CN | 8-4b | 4 |
| Cable, Main Motor | RG5-0978-000CN | 8-4b | 4+/5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Cable, Paper Feed | RG1-0542-020CN | 8-11 | 4/4+/5 |
| Clamp, Plate Release | RB1-2284-000CN | 8-10 | 4/4+ |
| Click, Spring | RF5-0374-000CN | 8-11 | 4/4+/5 |
| Click, Tray 1 Door (Qty 2) | RB1-7902-000CN | 8-4a | 5 |
| Connector PCA Assembly | RG5-0515-000CN | 8-4d | 4/4+/5 |
| Cover | RB1-2270-000CN | 8-10 | 4 |
| Cover | RB1-2345-000CN | 8-5 | 4/4+ |
| Cover | RB1-2628-000CN | 8-11 | 4/4+/5 |
| Cover, Connector | RB1-2357-000CN | 8-4c | 4/4+ |
| Cover, Connector | RB1-7897-000CN | 8-4c | 5 |
| Cover, Edge | RB1-2363-000CN | 8-4c | 4 |
| Cover, Front | RB1-2606-000CN | 8-11 | 4/4+ |
| Cover, Front | RB1-7977-000CN | | 5 |
| Cover, Heater | RB1-2289-000CN | 8-10 | 4 |
| Cover, Heater | RG5-0737-000CN | 8-10 | 4+ |
| Cover, High Voltage | RB1-2226-000CN | 8-4d | 4/4+/5 |
| Cover, Inner | RB1-2141-000CN | 8-4a | 4/4+ |
| Cover, Inner | RB1-7888-000CN | 8-4a | 5 |
| Cover, Left | RF5-0428-000CN | 8-10 | 4 |
| Cover, Left | RF5-0737-000CN | | 4+/5 |
| Cover, Legal | RB1-2391-000CN | 8-14 | 4/4+ |
| Cover, Legal | RB1-7969-000CN | 8-14 | 5 |
| Cover, Option Board | RB1-2366-000CN | 8-4c | 4/4+/5 |
| Cover, Rear Cassette | RB1-2645-000CN | 8-13 | 4/4+ |
| Cover, Rear Cassette | RB1-8009-000CN | 8-13 | 5 |
| Cover, Right | RF5-0427-000CN | 8-10 | 4 |
| Cover, Right | RF5-0736-000CN | 8-10 | 4+/5 |
| Cover, SIMM Board | RB1-2343-000CN | 8-4c | 4 |
| Cover, SIMM Board | RF5-0739-000CN | 8-4c | 4+ |
| Cover, SIMM Board | RF5-1654-000CN | 8-4c | 5 |
| Cover, Upper | RF5-0360-000CN | 8-3a | 4 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Cover, Upper | RF5-0732-000CN | 8-3a | 4+ |
| Cover, Upper | RF5-1643-000CN | 8-3b | 5 |
| Cover, Wire | RF5-0535-000CN | 8-10 | 4 |
| Cover, Wire | RF5-0738-000CN | 8-10 | 4+/5 |
| DC Controller PCA | C2001-69002 | 8-1b | 4 |
| DC Controller PCA | C2001-69002 | 8-4b | 4 |
| DC Controller PCA | C2037-69004 | 8-1b | 4+/5 |
| DC Controller PCA | C2037-69004 | 8-4b | 4+/5 |
| DC Controller PCA | RG5-0511-000CN | 8-1b | 4 |
| DC Controller PCA | RG5-0511-000CN | 8-4b | 4 |
| DC Controller PCA | RG5-0966-000CN | 8-1b | 4+/5 |
| DC Controller PCA | RG5-0966-030CN | 8-4b | 4+/5 |
| Display Assembly (English) | C2001-69010 | 8-3a | 4 |
| Display Assembly (English) | C2037-69005 | 8-3a | 4+ |
| Display Assembly (English) | RG5-0533-000CN | 8-3a | 4/4+ |
| Display Assembly (English) | RG5-1077-000CN | 8-3a | 4+ |
| Display Assembly (w/o overlay) | RG5-0478-000CN | 8-3a | 4 |
| Display Assembly (w/o overlay) | RG5-2238-000CN | 8-3a | 4+ |
| Display Assembly (w/o overlay) | RG5-2238-000CN | 8-3b | 5 |
| Display Assembly w/o overlay | C2001-69010 | 8-3 | 4 |
| Display Assembly w/o overlay | C2037-69005 | 8-3 | 4+ |
| Display Assembly w/o overlay | RG5-0478-000CN | 8-3 | 4 |
| Display Assembly w/o overlay | RG5-2238-000CN | 8-3 | 4+ |
| Display Cover | RB1-7887-000CN | 8-3b | 5 |
| Drive Gear Assembly | RG5-0457-000CN | 8-4b | 4 |
| Drive Gear Assembly | RG5-0876-050CN | 8-4b | 4+/5 |
| Drive Gear Cover | RB1-2318-000CN | 8-4b | 4 |
| Drive Gear Cover | RB1-3481-020CN | 8-4b | 4+/5 |
| Drive, Assembly, Lower Cassette | RG5-0481-000CN | 8-12 | 4 |
| Drive, Assembly, Lower Cassette | RG5-1099-000CN | 8-12 | 4+ |
| Drive, Assembly, Lower Cassette | RG5-2209-000CN | 8-12 | 5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Envelope Feeded (exchange) | C2082-69001 | | 4/4+ |
| Envelope Feeded (exchange) | C3927-69001 | | 5 |
| Envelope Feeder (new) | C2082B | | 4/4+ |
| Envelope Feeder (new) | C3827A | | 5 |
| Exhaust Duct | RB1-2112-000CN | 8-4b | 4 |
| Exhaust Duct | RB1-3544-000CN | 8-4b | 4+/5 |
| Exhaust Duct Cover | RB1-2113-000CN | 8-4b | 4 |
| Exhaust Duct Cover | RF5-0748-000CN | 8-4b | 4+/5 |
| Exhaust Fan | RH7-1143-000CN | 8-4b | 4 |
| Exhaust Fan | RH7-1177-000CN | 8-4b | 4+ |
| Exhaust Fan | RH7-1178-000CN | 8-4b | 5 |
| Exhaust Fan Cover | RB1-2350-000CN | 8-4b | 4+ |
| Exhaust Fan Cover | RB1-3547-000CN | 8-4b | 4+ |
| Font Door Cover | RG5-0459-000CN | 8-2 | 4/4+ |
| Foot (Qty 5) | RB1-2114-000CN | 8-4a | 4/4+/5 |
| Foot, Rubber (2) | RB1-2620-000CN | 8-11 | 4/4+/5 |
| Formatter PCA | C2002-67901 | 8-1b | 4 |
| Formatter PCA | C2002-67901 | 8-4c | 4 |
| Formatter PCA | C2002-69001 | 8-1b | 4 |
| Formatter PCA | C2038-39004 | 8-4c | 4+ |
| Formatter PCA | C2038-60004 | 8-1b | 4+/5 |
| Formatter PCA | C2038-60004 | 8-4c | 4+ |
| Formatter PCA | C2038-69004 | 8-1b | 4+/5 |
| Formatter PCA | C2202-6901 | 8-4c | 4 |
| Formatter PCA | C3919-67901 | 8-4c | 5 |
| Formatter PCA | C3919-69001 | 8-4c | 5 |
| Frame, Lower Assembly | RG5-0482-000CN | 8-11 | 4/4+ |
| Frame, Lower Assembly | RG5-2207-000CN | | 5 |
| Front Door Latch | XZ9-0340-000CN | 8-4a | 4/4+/5 |
| Front Door Latch | XZ9-0379-000CN | 8-4a | 4/4+ |
| Fuser Assembly (100/115V) | C2001-69003 | | 4 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Fuser Assembly (100/115V) | C2037-69001 | | 4+/5 |
| Fuser Assembly (220/240V) | C2001-69004 | | 4 |
| Fuser Assembly (220/240V) | C2037-69002 | | 4+/5 |
| Fuser Assembly (220/240V) | RG5-0455-000CN | | 4 |
| Fuser Assembly (220/240V) | RG5-0880-130CN | | 4+/5 |
| Fusing Assembly (100/110V) | C2001-69003 | 8-10 | 4 |
| Fusing Assembly (100/110V) | C2037-69001 | 8-10 | 4+/5 |
| Fusing Assembly (100/110V) | RG5-0454-000CN | 8-10 | 4 |
| Fusing Assembly (100/110V) | RG5-0879-000CN | 8-10 | 4+/5 |
| Fusing Assembly (220/240V) | C2001-69004 | 8-10 | 4 |
| Fusing Assembly (220/240V) | C2037-69002 | 8-10 | 4+/5 |
| Fusing Assembly (220/240V) | RG5-0455-000CN | 8-10 | 4 |
| Fusing Assembly (220/240V) | RG5-0880-000CN | 8-10 | 4+/5 |
| Gear, 23T | RS5-0232-000CN | 8-10 | 4 |
| Gear, 23T | RS5-0393-000CN | 8-10 | 4+/5 |
| Gear, 34T | RS5-0230-000CN | 8-10 | 4 |
| Gear, 42T | RS5-0388-000CN | 8-10 | 4+/5 |
| Guide, Cartridge | RB1-2100-000CN | 8-4a | 4/4+ |
| Guide, Cartridge | RB1-2101-020CN | 8-4a | 4/4+/5 |
| Guide, Cartridge | RB1-5730-000CN | 8-4a | 5 |
| Guide, Cassette | RB1-2107-000CN | 8-4a | 4/4+ |
| Guide, Cassette | RB1-7913-000CN | 8-4a | 5 |
| Guide, Cassette | RF5-0363-000CN | 8-4a | 4 |
| Guide, Cassette | RF5-1079-000CN | 8-4a | 4+ |
| Guide, Cassette | RF5-1657-000CN | 8-4a | 5 |
| Guide, Click, Left | RB1-7903-000CN | 8-4a | 5 |
| Guide, Click, Right | RB1-7923-000CN | 8-4a | 5 |
| Guide, Feeder | RB1-2236-000CN | 8-4d | 4/4+/5 |
| Guide, Font Cartridge | RB1-2337-000CN | 8-4c | 4 |
| Guide, Font Cartridge | RB1-3497-000CN | 8-4c | 4+/5 |
| Guide, I/O Option | RB1-2341-000CN | 8-4c | 4 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Guide, Lower Separation | RB1-2272-000CN | 8-10 | 4 |
| Guide, Lower Separation | RB1-3526-000CN | 8-10 | 4+/5 |
| Guide, Paper Entrance | RB1-2265-000CN | 8-10 | 4 |
| Guide, Paper Entrance | RB1-3518-000CN | 8-10 | 4+/5 |
| Guide, Separation | RF5-0536-000CN | 8-10 | 4 |
| Guide, Separation | RF5-0744-000CN | 8-10 | 4+/5 |
| Heater, Halogen (100/115V) | RH7-4046-000CN | 8-10 | 4 |
| Heater, Halogen (100/115V) | RH7-4054-020CN | 8-10 | 4+/5 |
| Heater, Halogen (220/240V) | RH7-4048-000CN | 8-10 | 4 |
| Heater, Halogen (220/240V) | RH7-4055-020CN | 8-10 | 4+/5 |
| Hex Head Screw | XA9-0623-000CN | 8-4d | 4/4+/5 |
| High Voltage PCA | C2001-69009 | 8-4d | 4 |
| High Voltage PCA | C2037-69009 | 8-4d | 4+/5 |
| High Voltage PCA | RG5-0513-000CN | 8-4d | 4 |
| High Voltage PCA | RG5-0969-040CN | 8-4d | 4+/5 |
| Hinge Stop | RB1-7894-000CN | 8-3b | 5 |
| Hinge, Arm | RB1-2329-000CN | 8-3a | 4 |
| Hinge, Arm (2 ea.) | RB1-3473-000CN | 8-3a | 4+ |
| Hinge, Bracket | RB1-2323-000CN | 8-3a | 4/4+ |
| Hinge, Bracket | RB1-2364-000CN | 8-3a | 4/4+ |
| Hinge, Pin (2 ea.) | RB1-2324-000CN | 8-3a | 4/4+ |
| Holder, Guide Roller | RB1-2181-000CN | 8-6a | 4/4+/5 |
| Holder, Latch | RB1-2125-000CN | 8-4a | 4 |
| Holder, Latch | RB1-3560-000CN | 8-4a | 4+ |
| Holder, Paper, Front | RF5-0369-040CN | 8-4d | 4/4+/5 |
| Holder, Paper, Rear | RB1-2259-040CN | 8-4d | 4/4+/5 |
| Holder, Roller, 4 ea. | RF5-0425-040CN | 8-8 | 4/4+/5 |
| Holding Plate | RB1-2353-000CN | 8-4a | 4/4+ |
| Holding Plate | RF5-1648-000CN | | 5 |
| IBM/Epson Emulation SIMM | C2081A | | 4 |
| Infrared Transceiver Pod | C2929A | | 5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Inner Cover Assembly | RB1-2609-000CN | 8-11 | 4+ |
| Inner Cover Assembly | RB1-7978-000CN | | 5 |
| Inner Cover Assembly | RG5-0487-000CN | 8-11 | 4 |
| Label | RS5-8219-000CN | 8-4c | 4/4+/5 |
| Label 110/115V | RS5-8205-000CN | 8-2 | 4/4+/5 |
| Label 220/240V | RS5-8916-000CN | 8-2 | 4/4+/5 |
| Laser/Scanner Assembly | C2001-69006 | 8-1b | 4 |
| Laser/Scanner Assembly | C2001-69006 | 8-4a | 4 |
| Laser/Scanner Assembly | C2037-69008 | 8-1b | 4+/5 |
| Laser/Scanner Assembly | C2037-69008 | 8-4a | 4+ |
| Laser/Scanner Assembly | RG5-0449-000CN | 8-1b | 4 |
| Laser/Scanner Assembly | RG5-0449-000CN | 8-4a | 4 |
| Laser/Scanner Assembly | RG5-0903-070CN | 8-1b | 4+/5 |
| Laser/Scanner Assembly | RG5-0903-070CN | 8-4a | 4+/5 |
| LC Base Assembly w/Legal | C3921A | | 5 |
| LC Base Assembly w/Legal Univ. cassette | C2083B | | 4 |
| LC Base Assembly w/Legal Univ. cassette | C2083D | | 4/4+ |
| LC Base Assembly w/non-Legal cassette | C2083A | | 4 |
| Left Cover | RB1-2347-000CN | 8-2 | 4 |
| Left Cover | RB1-3471-000CN | 8-2 | 4+ |
| Left Cover | RB1-7881-000CN | 8-2 | 5 |
| Lever, Release | RB1-2285-000CN | 8-10 | 4 |
| Lever, Release | RB1-3527-000CN | 8-10 | 4+ |
| Lever, Release-Left | RB1-2274-000CN | 8-10 | 4 |
| Lever, Release-Left | RB1-3523-000CN | 8-10 | 4+/5 |
| Lever, Sensor | RB1-2273-000CN | 8-10 | 4 |
| Lever, Sensor | RB1-3522-000CN | 8-10 | 4+/5 |
| Lever, Switch | RB1-2138-000CN | 8-6a | 4/4+/5 |
| Lock (Nut) | XA9-0400-000CN | 8-4c | 4 |
| Lock (Nut) | XA9-0704-000CN | 8-4c | 4+/5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Lower Cassette Tray, Univ. 500 sheet | C2084A | 8-13 | 4 |
| Lower Cassette Tray, Univ. 500 sheet | C2084C | 8-13 | 4+/5 |
| Lower Cassette Tray, Univ. 500 sheet Legal | C2084B | 8-13 | 4 |
| Lower Cassette Tray, Univ. 500 sheet Legal | C2084D | 8-13 | 4+/5 |
| Lower Cassette Tray, Univ. 500 sheet Legal | C3923A | 8-13 | 5 |
| Main Motor | RH7-1151-000CN | 8-4b | 4 |
| Main Motor | RH7-1169-000CN | 8-4b | 4+/5 |
| Main Switch Assembly | RB1-2119-00CN | 8-5 | 4 |
| Main Switch Assembly | RB1-7907-000CN | 8-5 | 4+/5 |
| Motor, Main Drive | RH7-1151-000CN | 8-4b | 4 |
| Motor, Main Drive | RH7-1169-000CN | 8-4b | 4+/5 |
| Motor, Paper Pickup | RH7-1136-000CN | 8-6b | 4 |
| Motor, Paper Pickup | RH7-1197-000CN | 8-6b | 4+ |
| Mount, Cover Assembly | RG5-0483-020CN | 8-11 | 4/4+/5 |
| Mount, DC Controller | RF5-0470-000CN | 8-4b | 4 |
| Mount, DC Controller | RF5-0743-000CN | 8-4b | 4+ |
| Mount, DC Controller | RF5-1653-000CN | 8-4b | 5 |
| Mount, Tray 1 Door | RB1-7901-000CN | 8-4a | 5 |
| MP Door | RB1-2351-000CN | 8-2 | 4 |
| MP Door | RB1-3559-000CN | 8-2 | 4+ |
| MP Door | RB1-7886-000CN | 8-2 | 5 |
| MP Tray (Tray 1) | RG5-0472-000CN | 8-7 | 4 |
| MP Tray (Tray 1) | RG5-0888-000CN | 8-7 | 4+ |
| MP Tray (Tray 1) | RG5-2199-000CN | 8-7 | 5 |
| MP Tray Extender | RB1-2143-000CN | 8-2 | 4 |
| MP Tray Extender | RB1-3558-000CN | 8-2 | 4+ |
| MP Tray Extender | RB1-7885-000CN | 8-2 | 5 |
| Multi-Purpose Tray Assembly | RG5-0472-000CN | 8-7 | 4 |
| Multi-Purpose Tray Assembly | RG5-0888-000CN | 8-7 | 4+ |
| Multi-Purpose Tray Assembly | RG5-2199-000CN | 8-7 | 5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Overlay (Czechoslovakian) | C3916-40023 | 8-3b | 5 |
| Overlay (Danish) | C2001-40008 | 8-3a | 4 |
| Overlay (Danish) | C3916-40011 | 8-3b | 5 |
| Overlay (Dutch) | C2001-40010 | 8-3a | 4 |
| Overlay (Dutch) | C3916-40013 | 8-3b | 5 |
| Overlay (English) | C2001-40001 | 8-3a | 4 |
| Overlay (English) | C3916-40005 | 8-3b | 5 |
| Overlay (English) | RB1-2359-000CN | 8-3a | 4 |
| Overlay (English) | RB1-3476-000CN | 8-3a | 4/4+ |
| Overlay (English) | RB1-7884-000CN | 8-3b | 5 |
| Overlay (European English) | C2037-40014 | 8-3a | 4/4+ |
| Overlay (Finnish) | C2001-40009 | 8-3a | 4 |
| Overlay (Finnish) | C3916-40014 | 8-3b | 5 |
| Overlay (French) | C2001-40002 | 8-3a | 4 |
| Overlay (French) | C3916-40006 | 8-3b | 5 |
| Overlay (German) | C2001-40003 | 8-3a | 4 |
| Overlay (German)) | C3916-40008 | 8-3b | 5 |
| Overlay (Hungarian) | C3916-40022 | 8-3b | 5 |
| Overlay (Italian) | C2001-40004 | 8-3a | 4 |
| Overlay (Italian) | C3916-40007 | 8-3b | 5 |
| Overlay (Japanese) | C3916-40021 | 8-3b | 5 |
| Overlay (Korean) | C3916-40018 | 8-3b | 5 |
| Overlay (Norwegian) | C2001-40006 | 8-3a | 4 |
| Overlay (Norwegian) | C3916-40010 | 8-3b | 5 |
| Overlay (Polish) | C2001-40011 | 8-3a | 4 |
| Overlay (Polish) | C3916-40015 | 8-3b | 5 |
| Overlay (Portuguese) | C2001-40013 | 8-3a | 4 |
| Overlay (Portuguese) | C3916-40012 | 8-3b | 5 |
| Overlay (Russian) | C3916-40026 | 8-3b | 5 |
| Overlay (Simplified Chinese) | C3916-40019 | 8-3b | 5 |
| Overlay (Spanish) | C2001-40005 | 8-3a | 4 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Overlay (Spanish) | C3916-40009 | 8-3b | 5 |
| Overlay (Swedish) | C2001-40007 | 8-3a | 4 |
| Overlay (Swedish) | C3916-40016 | 8-3b | 5 |
| Overlay (Thai) | C3916-40025 | 8-3b | 5 |
| Overlay (Traditional Chinese) | C3916-40017 | 8-3b | 5 |
| Overlay (Turkish) | C2001-40012 | 8-3a | 4 |
| Overlay (Turkish) | C3916-40020 | 8-3b | 5 |
| Overlay, Danish | C2037-40008 | 8-3a | 4+ |
| Overlay, Dutch | C2037-40010 | 8-3a | 4+ |
| Overlay, English | C2037-40001 | 8-3a | 4+ |
| Overlay, European English | C2037-40014 | 8-3a | 4 |
| Overlay, Finnish | C2037-40009 | 8-3a | 4+ |
| Overlay, French | C2037-40002 | 8-3a | 4+ |
| Overlay, German | C2037-40003 | 8-3a | 4+ |
| Overlay, Italian | C2037-40004 | 8-3a | 4+ |
| Overlay, Norwegian | C2037-40006 | 8-3a | 4+ |
| Overlay, Polish | C2037-40011 | 8-3a | 4+ |
| Overlay, Portugese | C2037-40013 | 8-3a | 4 |
| Overlay, Spanish | C2037-40005 | 8-3a | 4+ |
| Overlay, Swedish | C2037-40007 | 8-3a | 4+ |
| Overlay, Turkish | C2037-40012 | 8-3a | 4+ |
| Pad, Separation | RF5-0343-000CN | 8-6b | 4/4+/5 |
| Panel, I/O | RF5-0355-000CN | 8-4c | 4/4+/5 |
| Paper Control PCA | RG5-0512-000CN | 8-1 | 4/4+/5 |
| Paper Control PCA | RG5-0512-070CN | 8-6a | 4/4+/5 |
| Paper Feed Assembly | C2001-69005 | 8-6 | 4 |
| Paper Feed Assembly | C2001-69005 | | 4 |
| Paper Feed Assembly | C2037-69003 | 8-6 | 4+ |
| Paper Feed Assembly | C2037-69003 | | 4+ |
| Paper Feed Assembly | C3916-69005 | 8-6 | 5 |
| Paper Feed Assembly | C3916-69005 | | 5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Paper Feed Assembly | RG5-0451-000CN, | 4 | |
| Paper Feed Assembly | RG5-0451-000CN | 8-6 | 4 |
| Paper Feed Assembly | RG5-0877-000CN | 8-6 | 4+ |
| Paper Feed Assembly | RG5-0877-000CN | | 4+ |
| Paper Feed Assembly | RG5-2195-000CN | 8-6 | 5 |
| Paper Feed Assembly | RG5-2195-000CN | | 5 |
| Paper Output Assembly | RG5-0456-000CN | 8-8 | 4 |
| Paper Output Assembly | RG5-0456-000CN | | 4 |
| Paper Output Assembly | RG5-0886-000CN | 8-8 | 4+ |
| Paper Output Assembly | RG5-0886-000CN | | 4+ |
| Paper Output Assembly | RG5-2189-000CN | 8-8 | 5 |
| Paper Output Assembly | RG5-2189-000CN | | 5 |
| Paper Output Sensor Assembly | RG5-0475-060CN | 8-1 | 4/4+ |
| Paper Sensor Flag | RB1-2133-000CN | | 4/4+/5 |
| Paper Sensor Leaf Spring | RB1-2139-030CN | | 4/4+/5 |
| PC (Tray 1) Pickup Solenoid (SL 2) | RH7-5074-000CN | 8-6b | 4 |
| PC (Tray 1) Pickup Solenoid (SL 2) | RH7-5075-000CN | 8-6b | 4+/5 |
| PC (Tray 2) Pickup Solenoid (SL 1) | RH7-5070-000CN | 8-6a | 4 |
| PC (Tray 2) Pickup Solenoid (SL 1) | RH7-5071-000CN | 8-6a | 4+/5 |
| PC Tray (A4) | C2085C | 8-14 | 4 |
| PC Tray (A4) | C2085F | 8-14 | 4+ |
| PC Tray (A4) | C3926A | 8-14 | 5 |
| PC Tray (ltr) (Tray 2) | C2085B | 8-14 | 4 |
| PC Tray (ltr) (Tray 2) | C2085E | 8-14 | 4+ |
| PC Tray (ltr) (Tray 2) | C3925A | 8-14 | 5 |
| PCA, Sensor (PS4, PS5) | RG5-0514-000CN | 8-6b | 4/4+/5 |
| Photo-Sensor (PS1, PS2) (Qty. 2) | WG8-0291-000CN | 8-6a | 4/4+/5 |
| Photosensor (PS3) | WG8-0291-000CN | 8-9 | 4/4+/5 |
| Pin, Sensor Holder | RB1-2179-000CN | 8-6a | 4/4+/5 |
| Plate, End | RF5-0446-000CN | 8-13 | 4/4+ |
| Plate, End | RF5-1675-000CN | 8-13 | 5 |
| Plate, Grounding | RB1-2106-000CN | 8-4a | 4/4+/5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Plate, Grounding | RB1-2647-000CN | 8-11 | 4/4+/5 |
| Plate, Length Adjustment | RB1-2370-020CN | 8-14 | 4/4+/5 |
| Plate, PCA Holding | RB1-2365-000CN | 8-4c | 4 |
| Plate, PCA Holding | RB1-3493-000CN | 8-4c | 4+/5 |
| Plate, Pressure | RB1-7917-000CN | 8-4a | 5 |
| Plate, Pressure | RB1-7918-000CN | 8-4a | 5 |
| Plate, Pressure | RF5-0365-000CN | 8-4a | 4/4+ |
| Plate, Pressure | RF5-0366-000CN | 8-4a | 4/4+ |
| Plate, Reinforcement | RB1-3494-000CN | 8-4c | 4+ |
| Plate, Reinforcement | RB1-7892-000CN | 8-4c | 5 |
| Plate, Shield | RB1-2338-000CN | 8-4c | 4 |
| Plate, Shield | RF5-0471-000CN | 8-4c | 4 |
| Plate, Shield | RF5-0746-000CN | 8-4c | 4+ |
| Plate, Shield | RF5-1647-000CN | 8-4c | 5 |
| Plate, Side Adjust | RF5-0430-000CN | | 4/4+/5 |
| PostScript Level 2 Emulation SIMM | C2080A | | 4 |
| PostScript Level 2 Emulation SIMM | C3129A | | 4+ |
| PostScript Level 2 Emulation SIMM | C3918A | | 5 |
| PostScript SIMM Package | C3129-69001 | | 4 |
| PostScript SIMM Package | C3918-69001 | | 4+ |
| PostScript SIMM, Replacement Only | C2080-69001 | | 4 |
| Power Assembly (100/115V) | C2001-69007 | 8-4b | 4 |
| Power Assembly (100/115V) | C2037-69006 | 8-4b | 4+ |
| Power Assembly (100/115V) | RG5-0531-000CN | 8-4b | 4 |
| Power Assembly (100/115V) | RG5-2499-000CN | 8-4b | 4+ |
| Power Assembly (220/240V) | C2001-69008 | 8-4b | 4 |
| Power Assembly (220/240V) | C2037-69007 | 8-4b | 4+ |
| Power Assembly (220/240V) | RG5-0553-000CN | 8-4b | 4 |
| Power Assembly (220/240V) | RG5-2500-000CN | 8-4b | 4+ |
| Power Supply (100/110V) | C2001-69007 | 8-1a | 4 |
| Power Supply (100/110V) | C2037-69006 | 8-1a | 4+ |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Power Supply (100/110V) | RG5-0531-000CN | 8-1a | 4+/5 |
| Power Supply (100/110V) | RG5-0531-000CN | 8-1a | 4 |
| Power Supply (100/110V) | RG5-2499-000CN | 8-1a | 4+ |
| Power Supply (100/110V) | RG6-2499-000CN | 8-1a | 4+/5 |
| Power Supply (220/240V) | C2001-69008 | 8-1a | 4 |
| Power Supply (220/240V) | C2037-69007 | 8-1a | 4+ |
| Power Supply (220/240V) | RG5-0553-000CN | 8-1a | 4 |
| Power Supply (220/240V) | RG5-2500-000CN | 8-1a | 4+ |
| Rear Cover Assembly | RG1-3508-000CN | | 4+ |
| Rear Cover Assembly | RG1-3570-000CN | | 5 |
| Rear Door Assembly | RF5-0533-000CN | 8-2 | 4 |
| Rear Door Assembly | RF5-0733-000CN | 8-2 | 4+ |
| Rear Door Assembly | RF5-1645-000CN | 8-2 | 5 |
| Rear Door Latch | RB1-2335-000CN | 8-2 | 4/4+ |
| Rear Door Latch | RB1-3475-000CN | 8-2 | 4+/5 |
| Rear Door Latch | RB1-7890-000CN | 8-2 | 5 |
| Rear Door Spring | RS5-2219-000CN | 8-2 | 4/4+ |
| Rear Door Spring | RS5-2571-000CN | 8-2 | 5 |
| Rear Door Support Strap | RB1-2354-000CN | 8-2 | 4 |
| Rear Door Support Strap | RS5-2219-000CN | 8-2 | 4+/5 |
| Right Cover | RB1-2346-000CN | 8-2 | 4 |
| Right Cover | RB1-3470-000CN | 8-2 | 4+ |
| Right Cover | RF5-1644-000CN | 8-2 | 5 |
| Right Front Cover | RB1-7889-000CN | 8-2 | 5 |
| Ring, Roller (2 ea.) | FB1-0253-000CN | 8-10 | 4+/5 |
| Ring, Roller (2 ea.) | RA1-7584-000CN | 8-10 | 4 |
| Rod | RB1-2352-000CN | 8-4b | 4/4+ |
| Rod | RB1-7896-000CN | 8-4b | 5 |
| Roller, Guide | RB1-2182-000CN | 8-6a | 4/4+/5 |
| Roller, Guide | RB1-2616-000CN | 8-11 | 4/4+/5 |
| Roller, Guides (6) | RB1-2253-000CN | 8-4d | 4/4+/5 |
| Roller, Lower | RB1-2264-000CN | 8-10 | 4 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Roller, Lower | RB1-3517-030CN | 8-10 | 4+/5 |
| Roller, Lower Delivery | RF5-0438-000CN | 8-8 | 4 |
| Roller, Lower Delivery | RF5-1077-030CN | 8-8 | 4+/5 |
| Roller, MP Tray Pickup | RB1-2127-000CN | 8-6b | 4/4+ |
| Roller, MP Tray Pickup | RB1-2205-000CN | 8-6b | 5 |
| Roller, Pickup | RB1-2126-000CN | 8-6b | 4 |
| Roller, Pickup | RB1-2632-000CN | 8-12 | 4 |
| Roller, Pickup | RB1-2650-000CN | 8-12 | 4+ |
| Roller, Pickup | RB1-3477-000CN | 8-6b | 4+ |
| Roller, Pickup | RB1-7911-000CN | 8-6b | 5 |
| Roller, Pickup | RB1-7983-000CN | 8-12 | 5 |
| Roller, Transfer | RF5-0349-000CN | 8-4d | 4/4+/5 |
| Roller, Upper | RB1-2263-000CN | 8-10 | 4 |
| Roller, Upper | RB1-3516-020CN | 8-10 | 4+/5 |
| Roller, Upper Delivery | RF5-0534-000CN | 8-8 | 4/4+ |
| Roller, Upper Delivery | RF5-1076-020CN | | 5 |
| Rollers, Delivery, 4 ea. | RB1-2299-030CN | 8-8 | 4/4+/5 |
| Screw w/Washer, 4 ea. | XA9-0585-000CN | 8-4b | 4/4+/5 |
| Screw w/Washer, M3x29.5 | XA9-0668-000CN | 8-4b | 4+/5 |
| Screw with Washer (M3x8) (4) | XA9-0591-000CN | 8-3a | 4/4+ |
| Screw, 5mm hex head | XA9-0574-000CN | 8-4c | 4/4+/5 |
| Screw, M3x3 | XA9-0678-000CN | 8-10 | 4+/5 |
| Screw, M3x4 | XB6-7300-409CN | 8-10 | 4 |
| Screw, M3x4 | XB6-7300-409CN | 8-4c | 4 |
| Screw, M3x6 | XA9-0617-000CN | 8-4c | 4 |
| Screw, M3x6 | XA9-0670-000CN | 8-4c | 4+/5 |
| Screw, M3x6 | XA9-0702-000CN | 8-10 | 4+/5 |
| Screw, M3x6 | XB2-8300-607CN | 8-10 | 4 |
| Screw, M3x8 | XA9-0591-000CN | 8-11 | 4/4+/5 |
| Screw, Shoulder (M3) | RS5-9055-000CN | 8-10 | 4/4+/5 |
| Screw, Shoulder w/Washer (M3) | | 8-10 | 4+/5 |
| Screw, Shoulder w/Washer (M3) | RF5-0716-000CN | 8-10 | 4/4+/5 |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Screw, w/Spring Washer | XA9-0584-000CN | 8-4c | 4 |
| Screw, w/Spring Washer | XA9-0670-000CN | 8-4c | 4+/5 |
| Screw, w/Washer, 2 ea | XA9-0267-000CN | 8-4b | 4+/5 |
| Screw, w/Washer, 4 ea. | FA9-1449-000CN | 8-4b | 4 |
| Sensor PCA | RG5-0514-000CN | 8-6b | 4/4+/5 |
| Shaft | RF5-0375-000CN | 8-11 | 4/4+/5 |
| Sheet | RB1-2312-000CN | 8-4c | 4/4+/5 |
| Sheet | RB1-2313-000CN | 8-4c | 4/4+/5 |
| Shield, Font Cover | RB1-2366-000CN | 8-4c | 4 |
| Shield, Font Cover | RB1-3496-000CN | 8-4c | 4+ |
| Shield, Font Cover | RB1-7898-000CN | 8-4c | 5 |
| Shutter Spring, Torsion | RB1-2122-000CN | 8-4a | 4/4+/5 |
| Shutter, Arm | RB1-2111-030CN | 8-4a | 4/4+/5 |
| Shutter, Laser | RB1-2080-000CN | 8-4a | 4/4+/5 |
| Spring, Compression | RS5-2168-000CN | 8-10 | 4 |
| Spring, Compression | RS5-2218-000CN | 8-4a | 4/4+/5 |
| Spring, Compression | RS5-2265-020CN | 8-10 | 4+/5 |
| Spring, Compression, 4 ea. | RS5-2185-000CN | 8-8 | 4 |
| Spring, Compression, 4 ea. | RS5-2267-000CN | 8-8 | 4+/5 |
| Spring, Guide | RB1-2286-000CN | 8-10 | 4/4+/5 |
| Spring, Leaf | RB1-2330-000CN | 8-3a | 4/4+ |
| Spring, Leaf | RB1-7893-000CN | 8-3b | 5 |
| Spring, Left Cartridge Guide | RB1-5731-000CN | 8-4a | 5 |
| Spring, Roller, 4 ea. | RB1-2302-000CN | 8-8 | 4/4+/5 |
| Spring, Switch | RB1-2358-000CN | 8-4a | 4/4+ |
| Spring, Switch | RB1-2966-000CN | 8-4a | 5 |
| Spring, Tension | RS5-2180-000CN | 8-10 | 4/4+/5 |
| Spring, Tension (Qty. 2) | RS5-2170-000CN | 8-4a | 4/4+/5 |
| Spring, Torsion | RB1-5732-000CN | 8-4a | 4/4+/5 |
| Static Eliminator | RB1-2237-020CN | 8-4a | 4/4+/5 |
| Stop, Hinge | RB1-2314-000CN | 8-3a | 4/4+ |

| Description | Part # | Fig. # | Printer |
|---|---|---|---|
| Support, Cartridge | RB1-2105-030CN | 8-4a | 4/4+/5 |
| Switch | RB1-2119-000CN | 8-5 | 4/4+ |
| Switch | RB1-7907-000CN | 8-5 | 5 |
| Thermistor | RH7-7045-000CN | 8-10 | 4 |
| Thermistor | RH7-7054-000CN | 8-10 | 4/4+ |
| Thermoswitch Assembly | RG5-0474-000CN | 8-10 | 4 |
| Thermoswitch Assembly | RG5-0881-000CN | 8-10 | 4+/5 |
| Toner Cartridge | 92298A | | |
| Tool, hook | RB1-7895-000CN | 8-3b | 5 |
| Top Cover Door | RB1-2322-000CN | 8-3a | 4 |
| Top Cover Door | RB1-3474-000CN | 8-3a | 4+ |
| Top Cover Door | RB1-7883-000CN | 8-3b | 5 |
| Transfer Block Assembly | RG5-0468-000CN | 8-4d | 4/4+ |
| Transfer Block Assembly | RG5-2192-000CN | 8-4d | 5 |
| Transfer Guide Assembly | RG5-0469-000CN | 8-4a | 4/4+/5 |
| Transfer Guide Assembly | RG5-0469-020CN | 8-1a | 4/4+/5 |
| Upper Cover Assembly | RG5-0458-000CN | 8-3a | 4 |
| Upper Cover Assembly | RG5-0872-000CN | 8-3a | LJ4+ |
| Upper Cover Assembly | RG5-2186-000CN | 8-3b | 5 |
| Upper Frame | RB1-3515-000CN | 8-10 | 4/4+/5 |
| Upper Guide, Delivery | RF5-0532-000CN | 8-8 | 4/4+ |
| Upper Guide, Delivery | RF5-0647-000CN | 8-8 | 5 |
| Washer, Grounding | RB1-2287-000CN | 8-10 | 4 |
| Washer, Grounding | RB1-3528-000CN | | 4+/5 |
| Weight | RB1-2627-020CN | 8-12 | 4/4+/5 |

# A

# Duplexer

This Appendix contains a functional overview of the Optional Duplexer, as well as step-by-step Installation and Removal & Replacement instructions.

The Optional Duplexer, when used with the LaserJet 4 Plus/5 printer, allows printing on both sides of the paper. It may be used with the optional 500-sheet Lower Cassette or with the printer alone.

**Note** The Duplexer works only with the LaserJet 4 Plus or LaserJet 5 printer. It is not supported on the LaserJet 4.

## Functional Overview

The Duplexer consists of two major assemblies; the Switchback Assembly that is attached to the back of the printer and the Holding Tray located directly under the printer (see Figure A-1.)

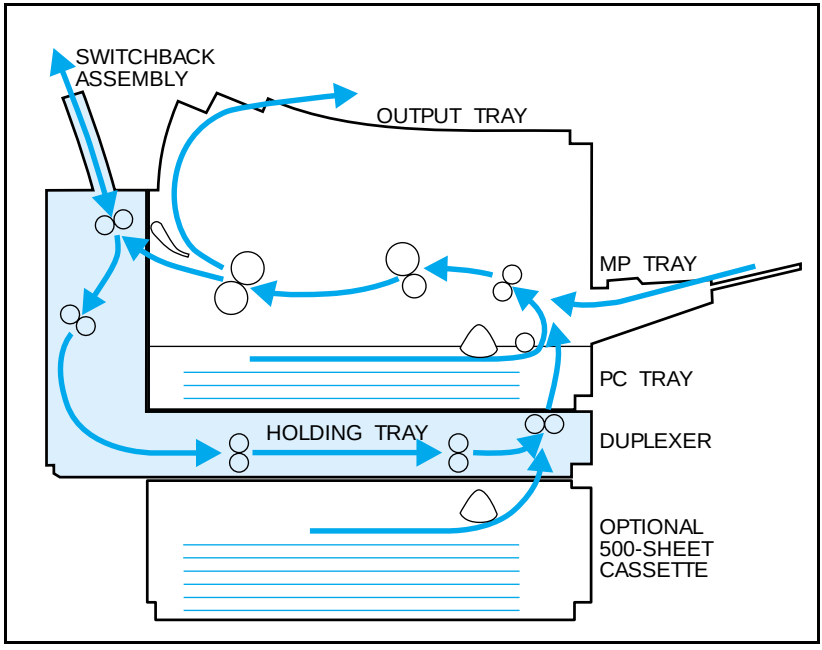


**Figure A-1 Duplexer Paper Path**

## Duplex Printing

**Note** The **bold text** and numbers in the following description refer to parts shown in Figure A-2.

When the printer is operating in duplex mode, the print images are printed in reverse order. Page two prints on the first pass of the paper through the printer and page one prints on the second pass through.

### Switchback Assembly

To print the first pass, the paper goes through the printer paper path, where it is developed and fused. As the paper exits the fuser, the **Switchback Solenoid (1)** is activated. The Switchback Solenoid moves the **Switchback Input Paper Guide (2)**, routing the paper into the Switchback mechanism. The **Switchback Stepper Motor (3)** then pulls the paper out of the printer into the Switchback Assembly. (The paper can be seen coming out of the top of the Switchback Assembly.)

As the paper moves through the Switchback Assembly, the spring loaded switchback **Paper Reversing Guide (4)** and its attached flag is moved, activating the **Switchback Paper Sensor (5)**. The paper continues to move out of the Switchback Assembly until it passes the switchback Paper Reversing Guide. The switchback Paper Reversing Guide returns to its original position when the paper passes it. The flag attached to the guide switches the electrical state of the switchback paper sensor. This signals the **Duplex Control PCA (6)** that the paper has advanced far enough to reverse direction. The Duplex Control PCA then reverses the direction of the Switchback Stepper Motor, causing the paper to reverse direction and move into the duplex **Holding Tray (7)**.

### Holding Tray

The Holding Tray, as the name implies, holds the paper which has been printed on one side while the print engine prepares to print the second side. The major components of the Holding Tray are the **Holding Tray Input Stepper Motor (8)**, the **Holding Tray Output Stepper Motor (9)**, and the **Holding Tray Paper Detect Sensor (10)**.

As the paper moves from the Switchback Assembly, it is picked up by the rollers that are operated by the Holding Tray Input Stepper Motor. The Input Stepper Motor moves the paper into the Holding Tray. When the paper moves the flag that controls the Holding Tray Paper Sensor, the Duplex Control PCA turns off the Input Stepper Motor, and the paper stops moving.

The paper remains in the Holding Tray until the print engine signals the Duplex Control PCA that it is ready to print the second side. The Duplex Control PCA will then turn on both the Holding Tray Input Stepper Motor and the Holding Tray Output Stepper Motor. These motors will move the paper out of the Holding Tray into the paper input of the print engine. The paper is then printed on the second side. When the paper exits the Fuser Assembly, the Switchback Input Guide routes the paper directly to the printer's output tray.

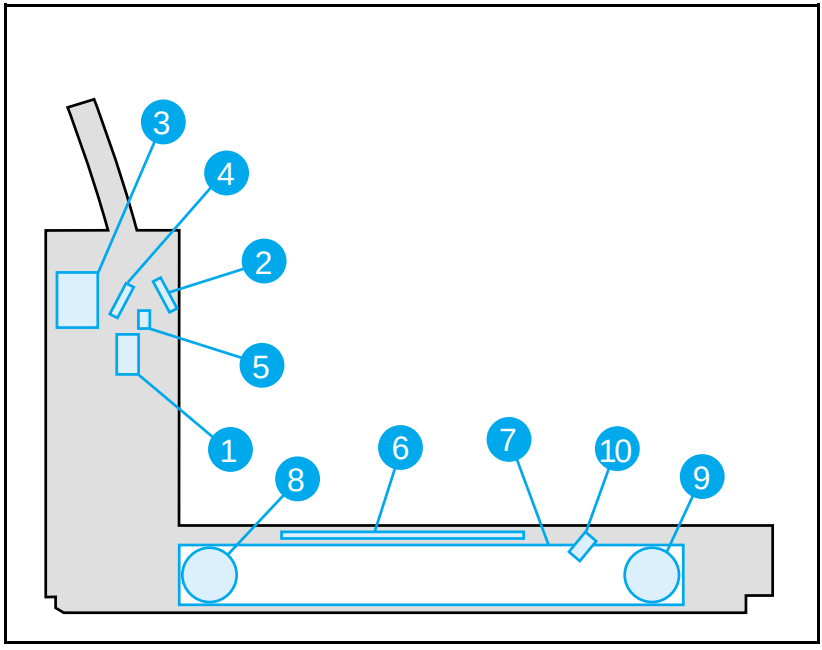


**Figure A-2 Duplexer Major Components**

## Electrical Overview

The block diagram in Figure A-3 shows the Duplexer electrical components.

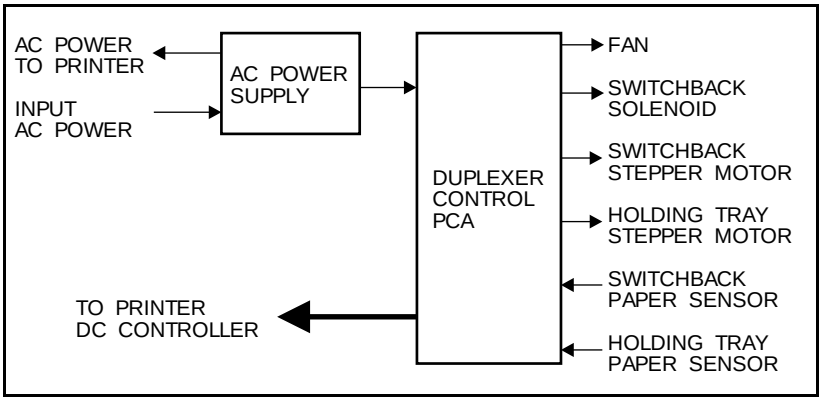


**Figure A-3 Electrical Block Diagram**

# Installing the Optional Duplexer

The optional Duplexer can be installed by the customer. There are no fasteners securing the units together. The printer simply rests in place on top of the Duplexer, which, in turn, rests on top of the optional 500-sheet Lower Cassette, if used.

To install the Duplexer, first turn power OFF and disconnect all cables from the printer. Follow the steps below, referring to the corresponding steps illustrated in Figure A-4.

- Open the printer's rear door and use needle-nose pliers to release the door strap from the printer.

**LJ 4 +**

- Grasp the plastic retaining clip and lift it upward and away from the door.
- Slide the door toward the left.
- Swing the right end of the door out from the printer and slide it toward the right to free it from its hinge.

**LJ 5**

- Flex the rear door to release it from its hinges. (Press the middle of the door while lifting either side.)

- Place the Duplexer on a flat surface and tilt the Switchback Assembly partially back.
- Verify the alignment pins on the Duplexer mate with the holes in the bottom of the printer, and if used, the top of the optional 500-sheet Lower Cassette. Place the printer on top of the Duplexer.
- Close the rear door (Switchback Assembly) and plug in all cables - note routing of the power cables as shown.

**Note**

Removal of the Duplexer from the printer is the reverse of installation - simply unplug cables, unlatch the Switchback Assembly, and lift the printer off the top. If the optional 500-sheet Lower Cassette is being used, lift the duplexer off the Lower Cassette.

For further information, refer to the illustrated steps in Figure A-4 on the next page.

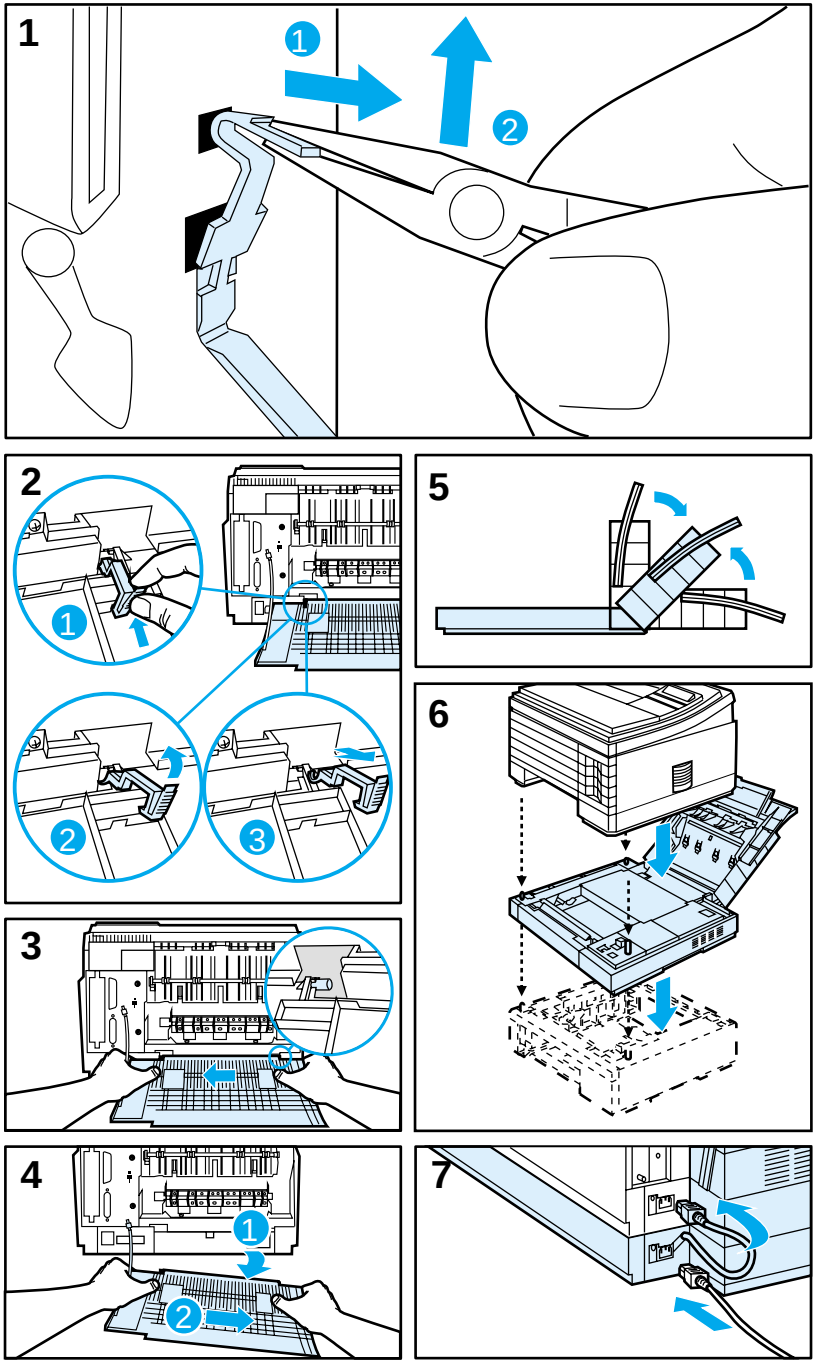


Figure A-4 Duplexer Installation/Removal

# Removal and Replacement

This section describes the complete disassembly of the Duplexer. Tasks that must be performed before beginning the procedure are listed first. Remove the assemblies in the order listed to prevent damage.

The assembly procedure is the reverse of the removal procedure, except where specific instructions are provided.

In the removal and replacement procedures that follow, the number inside the parentheses, such as (4), refers to the number of screws to remove.

**Warning** Power OFF the printer and disconnect the power cord from the outlet and the printer before servicing the Duplexer.

Some sheet metal edges are sharp. Be careful when working in these areas to avoid being cut.

**Caution** The Duplexer contains parts that are sensitive to Electro-Static Discharge (ESD). Always observe proper ESD procedures when servicing the Duplexer.

This symbol appears when the parts being serviced are especially susceptible to ESD damage.

## Required Tools

#2 Magnetized Phillips Screwdriver
Small Flat-head Screwdriver (6-inch shaft)
Needle-nose Pliers

**Caution** Do not use a Pozidriv screwdriver. Damage to the screw heads will result.

## Removing the Covers

### Removing the Switchback Covers

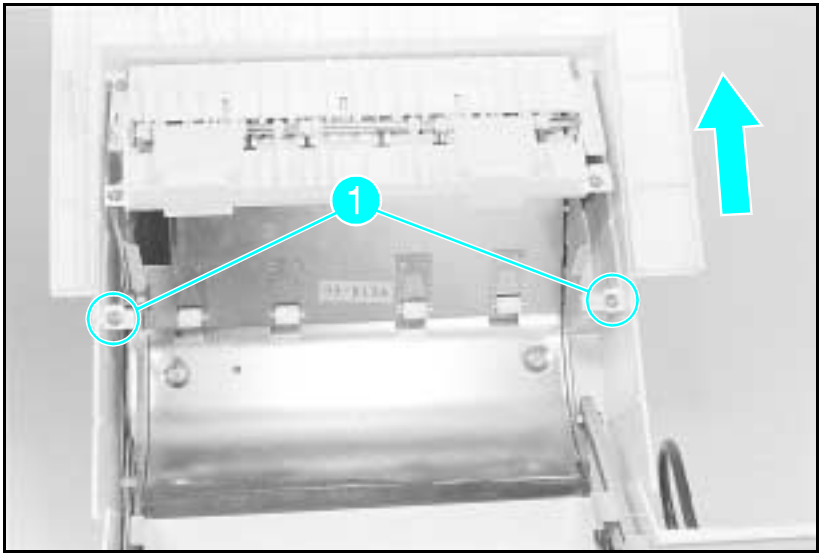


Figure A-5 Switchback Cover

**1** Remove the (2) screws shown in Figure A-5, callout 1.
**2** Lift the cover off the Switchback Assembly.

### Removing the Side Cover on Power Side

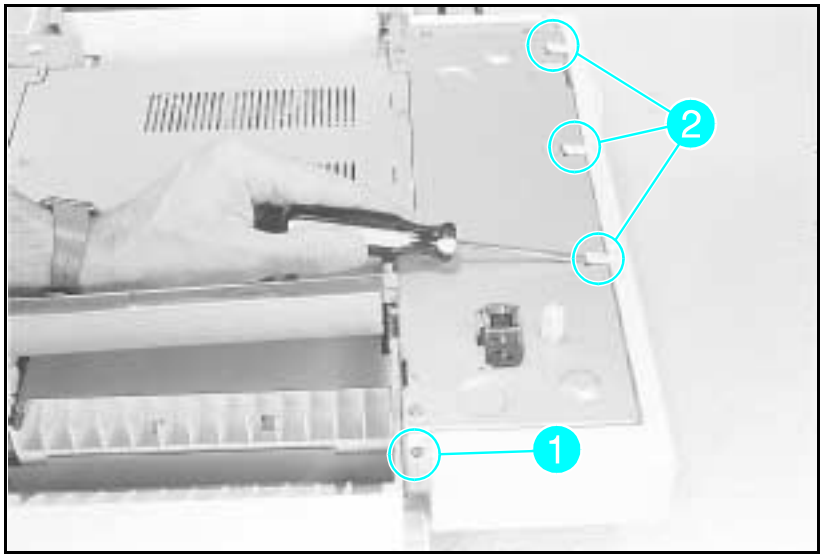


Figure A-6 Side Cover

**1** Open the front door.
**2** Remove the (1) screw shown in Figure A-6, callout 1.
**3** Release the (3) latch points with a flat screwdriver and rotate the cover downward (see Figure A-6, callout 2).

### Removing the Side Cover on Gear Side

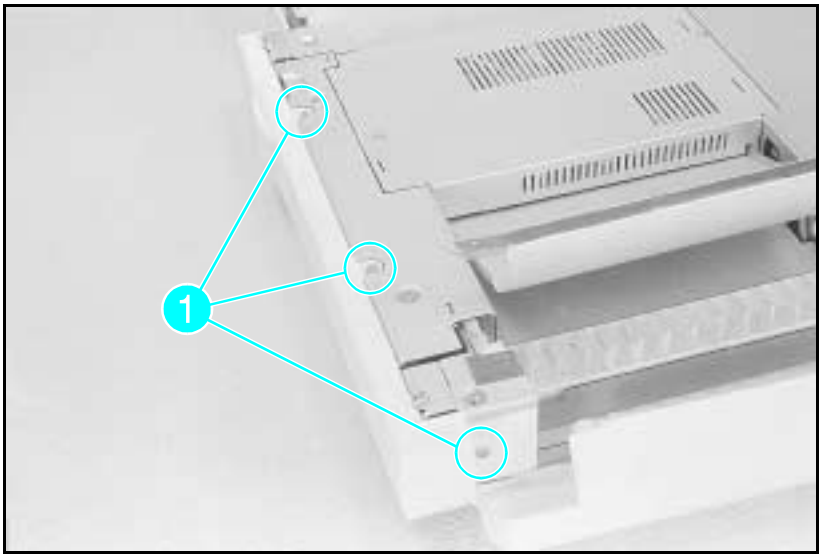


Figure A-7 Side Cover on Gear Side

**1** Remove the (2) screws on top and the (1) screw on the front (see Figure A-7, callout 1).
**2** Turn the Duplexer on its side to access the latch location on the underside.
**3** Release the (1) latch point with a flat screwdriver and lift the cover off (see Figure A-8).

**Figure A-8 Latch Location on Underside of Duplexer**

### Removing the Back Cover

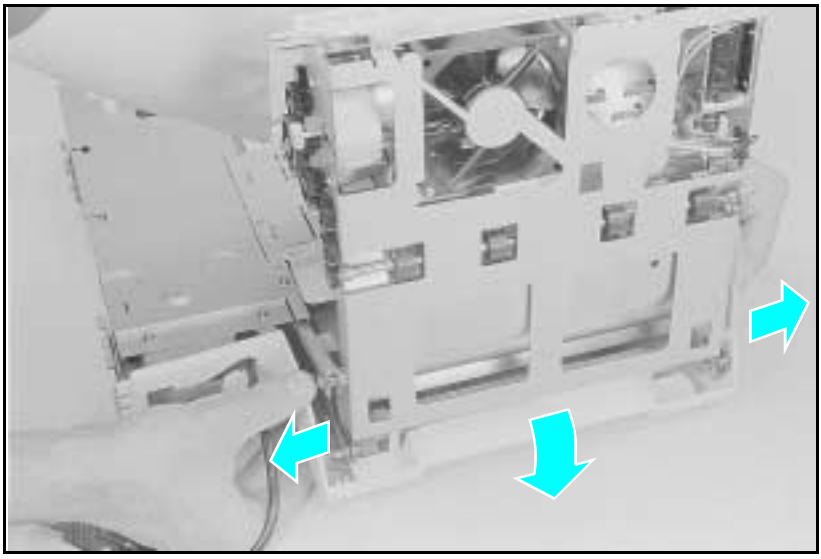

Figure A-9 Back Cover

1 Place the duplexer on a table or bench so that the back overhangs the edge by a few inches.
2 Release the (2) locating pins as shown in Figure A-9.
3 Rotate the cover downward until it is free.

### Removing the Front Cover

With the side covers removed, the front cover is only attached by the holding tray arm.

1 With both side covers removed, open the holding tray.
2 Rotate the front cover 90 degrees to release the holding tray arm.

## Removing Internal Duplexer Components

### Removing the Fan/Motor/Solenoid/Sensor

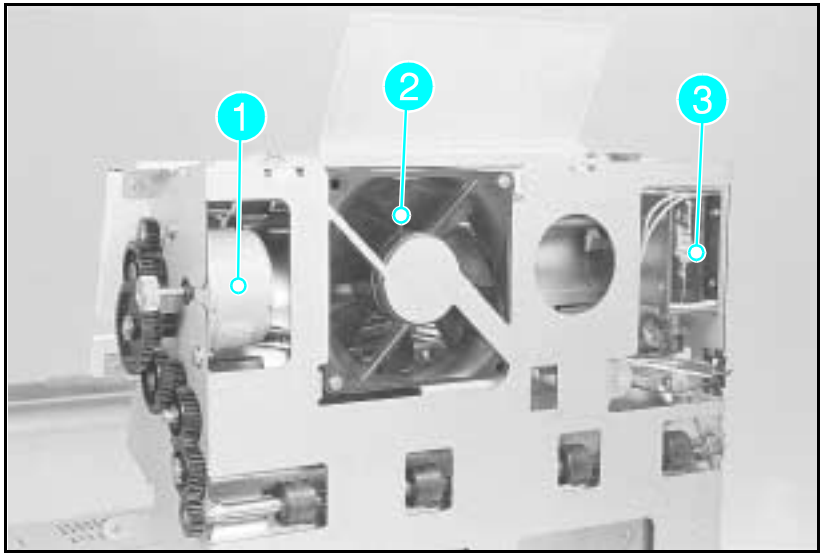


Figure A-10 Switchback Assembly - Stepper Motor Side

Access to the electronic components of the switchback assembly is easy once the covers are removed. Note the location of the switchback stepper motor (Figure A-10, callout 1), the switchback fan assembly (callout 2) and the switchback solenoid (callout 3).

## Removing the Switchback Paper Guide

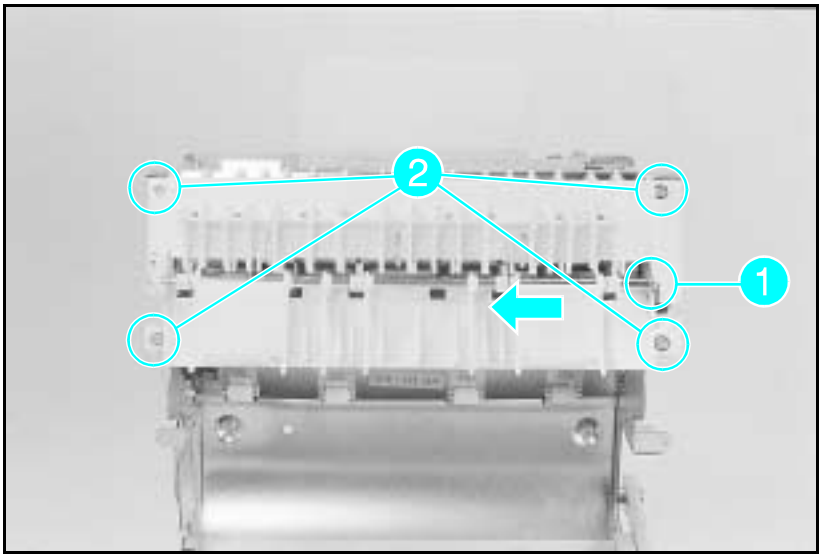


Figure A-11 Switchback Paper Guide

1 Remove the (1) E-clip from the shaft on the stepper motor side shown in Figure A-11, callout 1.
2 Pull the shaft toward the left and out of its track.
3 Rotate the shaft 90 degrees to remove it from the metal paper guide solenoid arm.

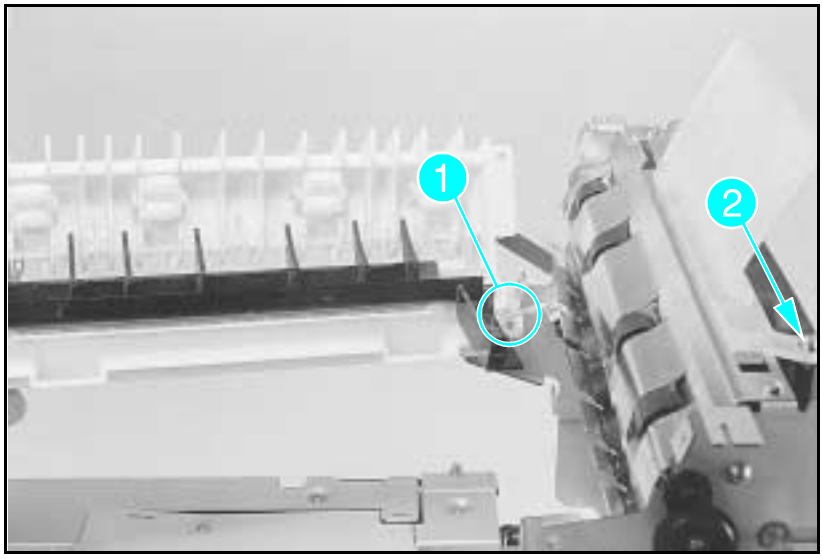


Figure A-12 Wire Routing and Upper Switchback Guide Screw

**1** Remove the (4) screws shown in Figure A-11, callout 2.
**2** Lift the switchback assembly and clear the wires.
**3** Remove the assembly.

**Note:** When re-assembling, verify proper wire routing as shown in Figure A-12, callout 1.

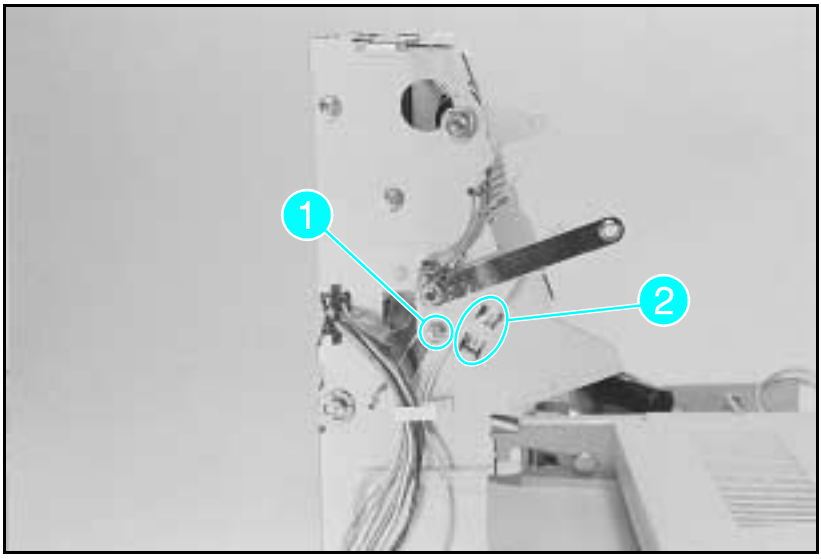


Figure A-13 Solenoid Arm

**1** Remove the (1) screw below the Switchback Solenoid Arm on the gear side as shown in Figure A-13, callout *1*.
**2** Remove the sensor, squeezing the tabs on the underside of the sensor (see Figure A-13, callout *2*).

*(continued on next page)*

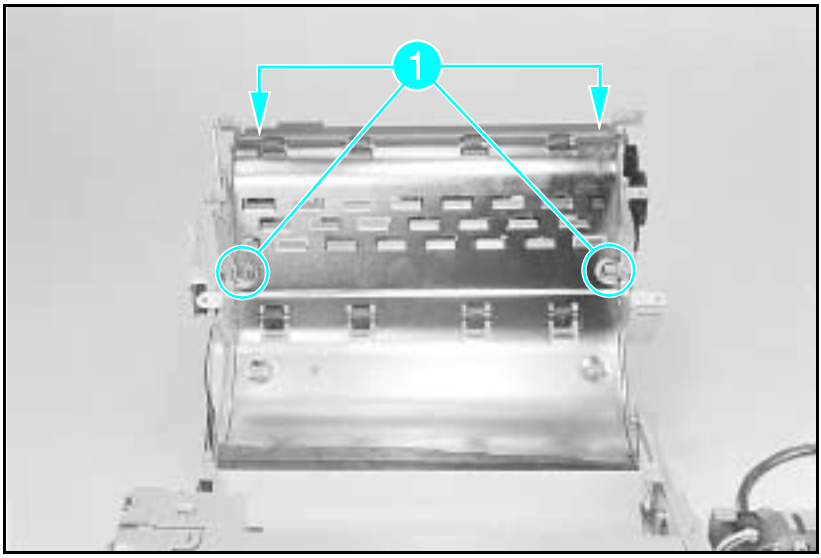


**Figure A-14 Upper Paper Guide Sheet Metal**

**3** Remove the (1) screw shown previously in Figure A-12, callout *2*. Remove the upper switchback paper guide by releasing its latch with a flat screwdriver and pushing to the side.

**4** Remove the (4) screws on top of the sheet metal part of the upper paper guide shown in Figure A-14, callout *1*.

*(continued on next page)*

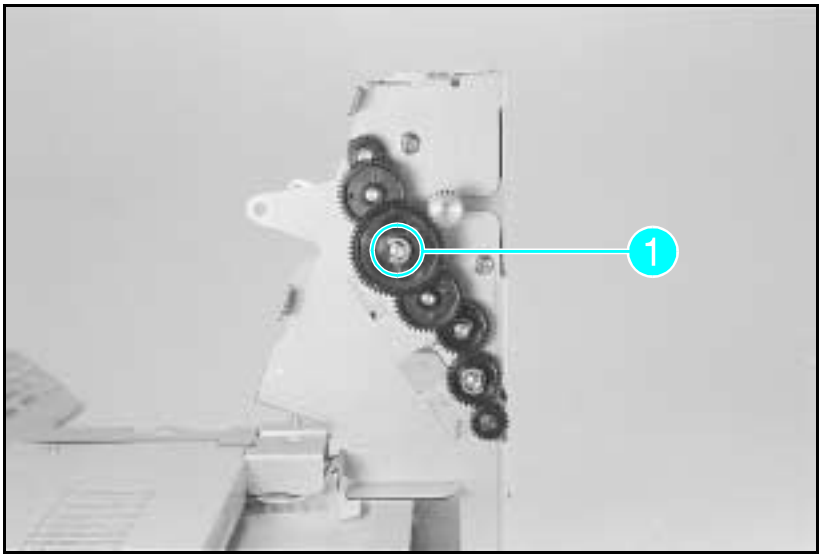


**Figure A-15 Gears on Paper Roller**

**5** Remove the (1) E-clip from the gears on the shaft on the Power PCA side shown in Figure A-15, callout *1*.

**6** Rotate the bushings and lift the roller out.

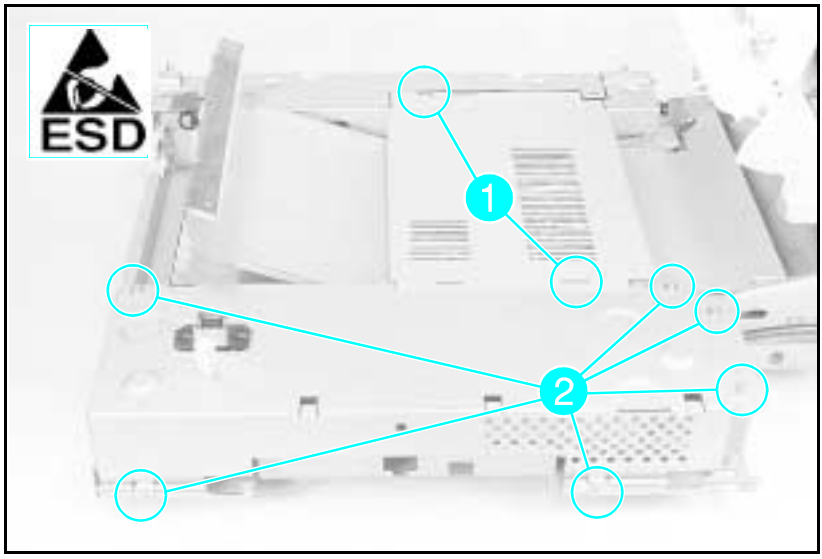


**Figure A-16 Cover Plate**

**1** Remove the (2) screws shown in Figure A-16, callout *1*.
**2** Remove the cover plate.

*(continued on next page)*

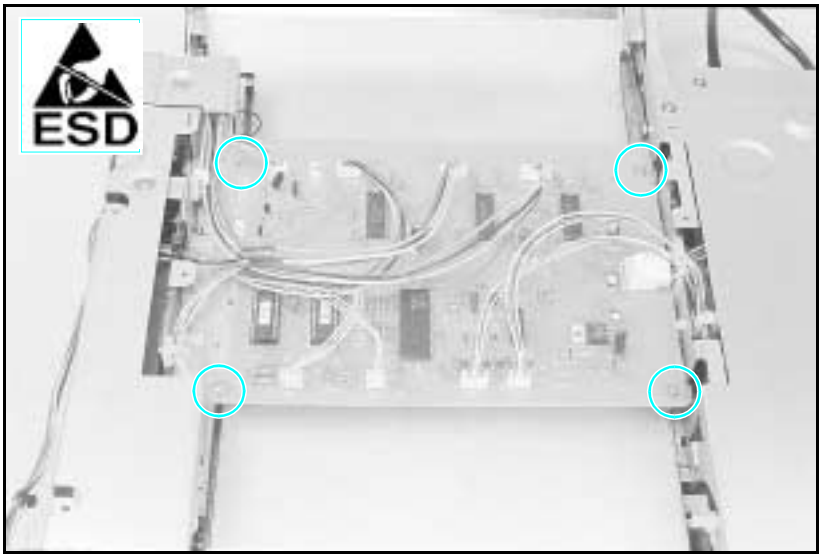


Figure A-17 Control PCA

**3** Unplug all connectors from the Control PCA.

**Note** The Control PCA connectors are keyed.

**4** Remove the (4) screws shown in Figure A-17.
**5** Disconnect the connector from the power supply.
**6** Remove the PCA.

### Removing the Power PCA

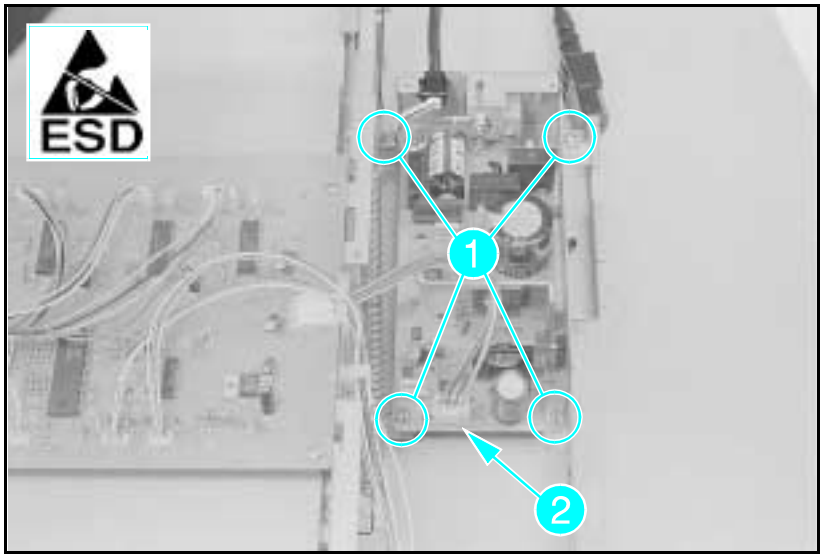


Figure A-18 Power PCA

**1** Remove the (6) cover screws, (4) on the top and (2) on the side. Remove the cover.
**2** Remove the (4) screws from the Power PCA (see Figure A-18, callout *1*).
**3** Unplug the connector (see Figure A-18, callout *2*).
**4** Lift the Power PCA out of the duplexer.

## Removing the Holding Tray Center Paper Guide

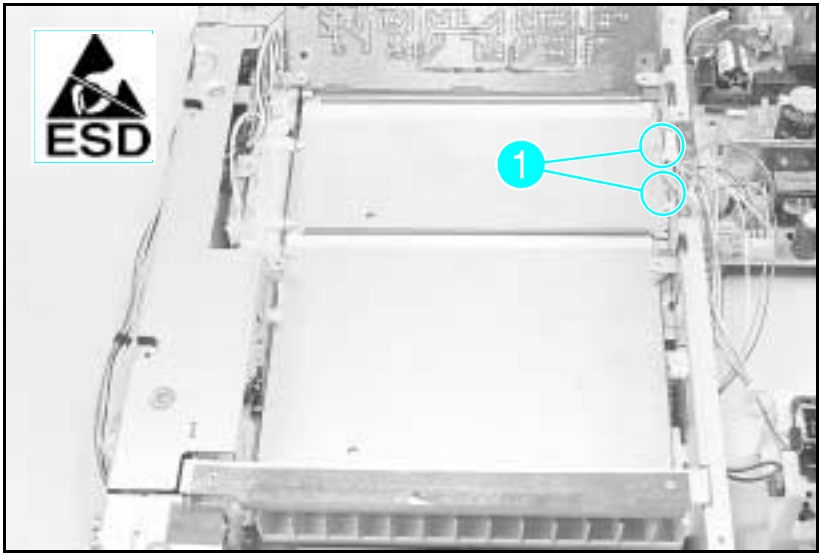


Figure A-19 Plate on Power PCA Side of Duplexer

**1** Remove the Control PCA as described earlier.
**2** Remove the (2) screws from the plate located on the power PCA side of the duplexer (see Figure A-19, callout *1*).
**3** Lift off the guide.

## Removing the Holding Tray Belt

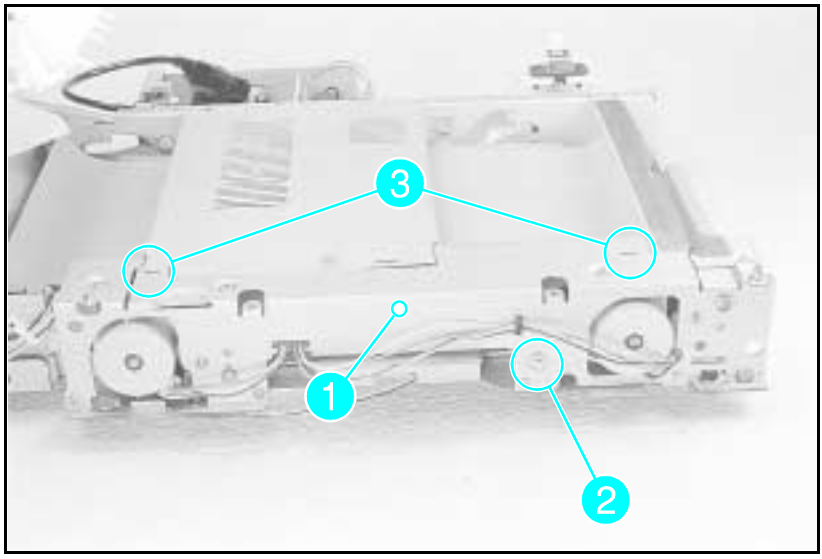


Figure A-20 Holding Tray Belt Cover Plate

**1** Remove all the screws securing the plate (see Figure A-20, callout 1).
**2** Remove (1) E-clip shown in Figure A-20, callout *2*.
**3** Remove the bushing underneath the E-clip.
**4** Release (2) latch points shown in Figure A-20, callout *3*.

**Note:** The (2) washers on the gear beside the bushing are now loose. Remove and set aside.

**5** Release the wires from the wire holder, allowing the cover to move aside to access the gears.

*(continued on next page)*

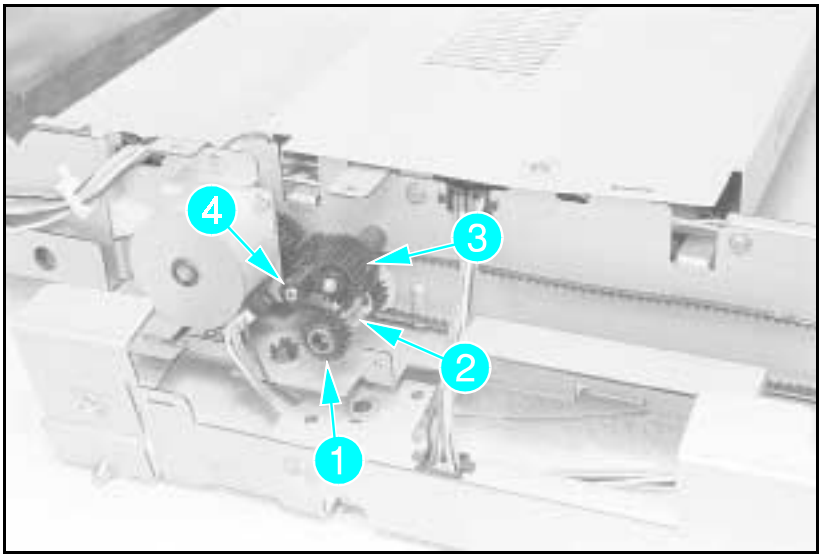


**Figure A-21 Holding Tray Gears and Belt**

**6** Remove the (1) one-way gear shown in Figure A-21, callout *1*.

**Note** The one-way gear must be reassembled correctly. With the gear on the shaft, turn the gear clockwise. The shaft should move the belt. Turning the gear counter clockwise should result in no movement of the shaft and belt.

**7** Remove the (1) E-clip from behind the first gear (see Figure A-21, callout 2).

**8** Remove the (2) gears shown in Figure A-21, callouts *3* and *4*.

**9** Slip the belt off the gears.

**Note** Verify proper wire routing when reassembling.

### Removing the Holding Tray Paper Sensor

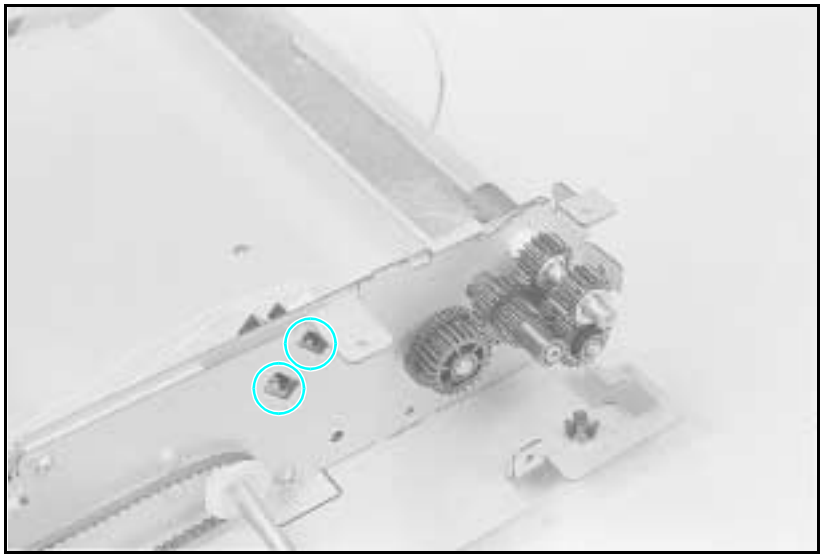

Figure A-22 Holding Tray Paper Sensor

1 Release the output holding tray.
2 Remove the (2) screws from the stepper motor mount and remove mount. (This provides access to the paper sensor latches.)
3 Squeeze the (2) latch points of the paper sensor to release (see Figure A-22).
4 Disconnect the connector and remove the paper sensor.

## Removing the Switchback Assembly

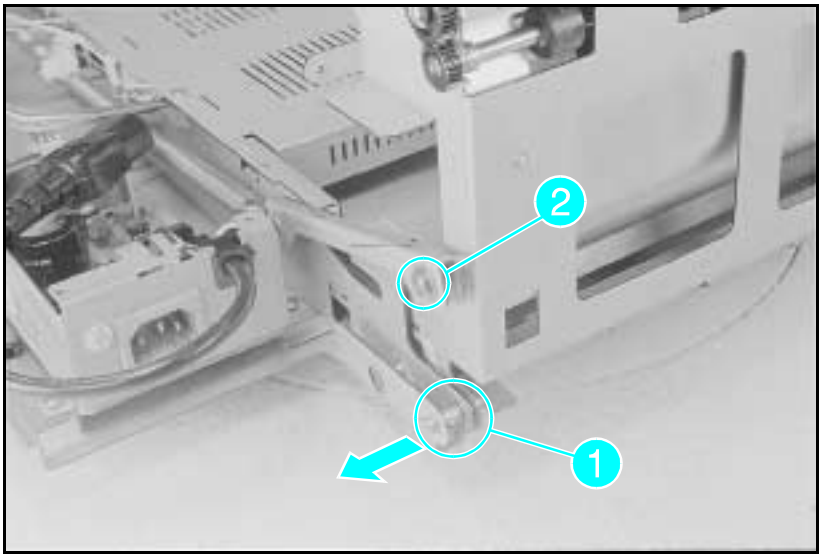


Figure A-23 Switchback Assembly Hinge Pins

**1** Pull out the pin located on the Power PCA side (see Figure A-23, callout *1*).
**2** Release the (1) E-clip on the upper pin near the retaining arm (see Figure A-23, callout *2*).
**3** Pull the retaining arm off the pin.
**4** Rotate the switchback assembly and remove.
**5** Unplug the connectors.

# Parts and Diagrams for the Duplexer

The figures in this section illustrate the major subassemblies and component parts of the HP LaserJet 4+/5 Duplexer.

**Note**

Not all duplexer parts are orderable. The parts listed are the only orderable parts. Parts that have no reference designator or part number are not field-replaceable and cannot be ordered through HP.

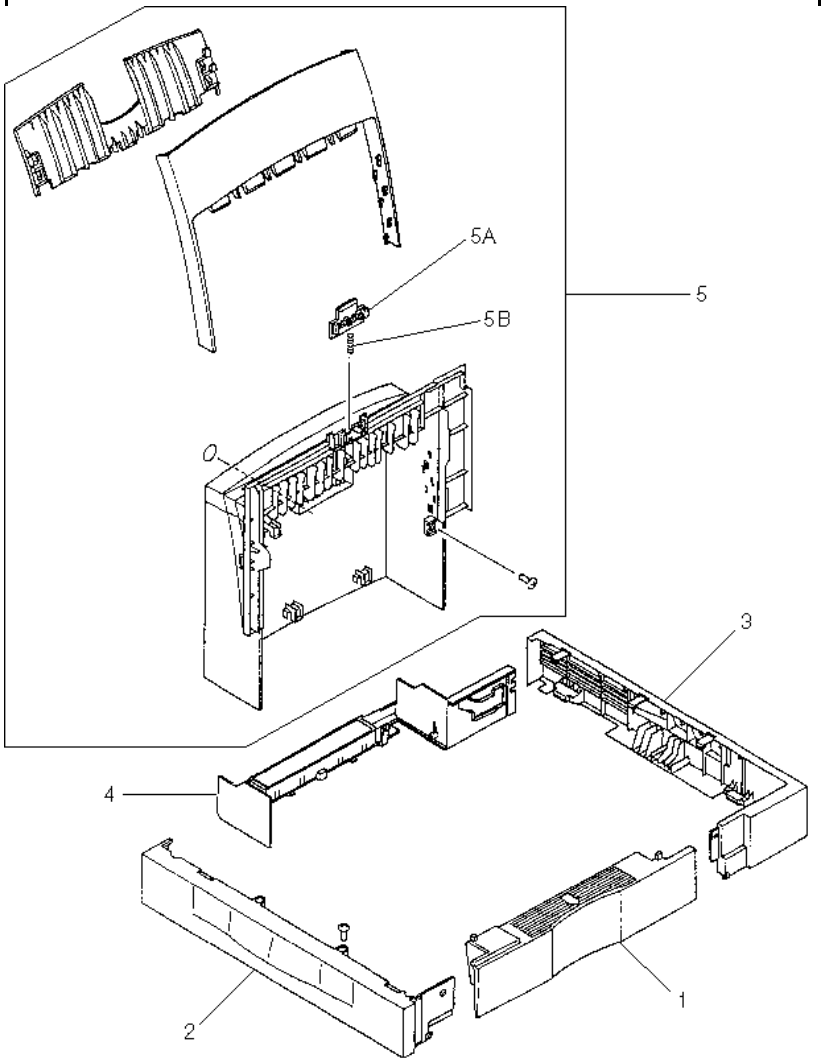


**Figure A-24 Duplex External Covers**

## Table A-24 Duplex External Covers

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RA2-2061-000CN<br>RA2-2231-000CN | LJ4+<br>LJ5 | Front Cover |
| 2 | RA2-2096-000CN<br>RA2-2232-000CN | LJ4+<br>LJ5 | Left Cover |
| 3 | RA2-2097-000CN<br>RA2-2233-000CN | LJ4+<br>LJ5 | Right Cover |
| 4 | RA2-2098-000CN<br>RA2-2237-000CN | LJ4+<br>LJ5 | Rear Lower Cover |
| 5 | RG1-3508-000CN<br>RG1-3570-000CN | LJ4+<br>LJ5 | Rear Cover Assembly |
| 5A | RA2-2100-000CN | LJ4+ | Latch |
| 5B | RS1-2413-000CN<br>RS5-2571-000CN | LJ4+<br>LJ5 | Compression Spring |

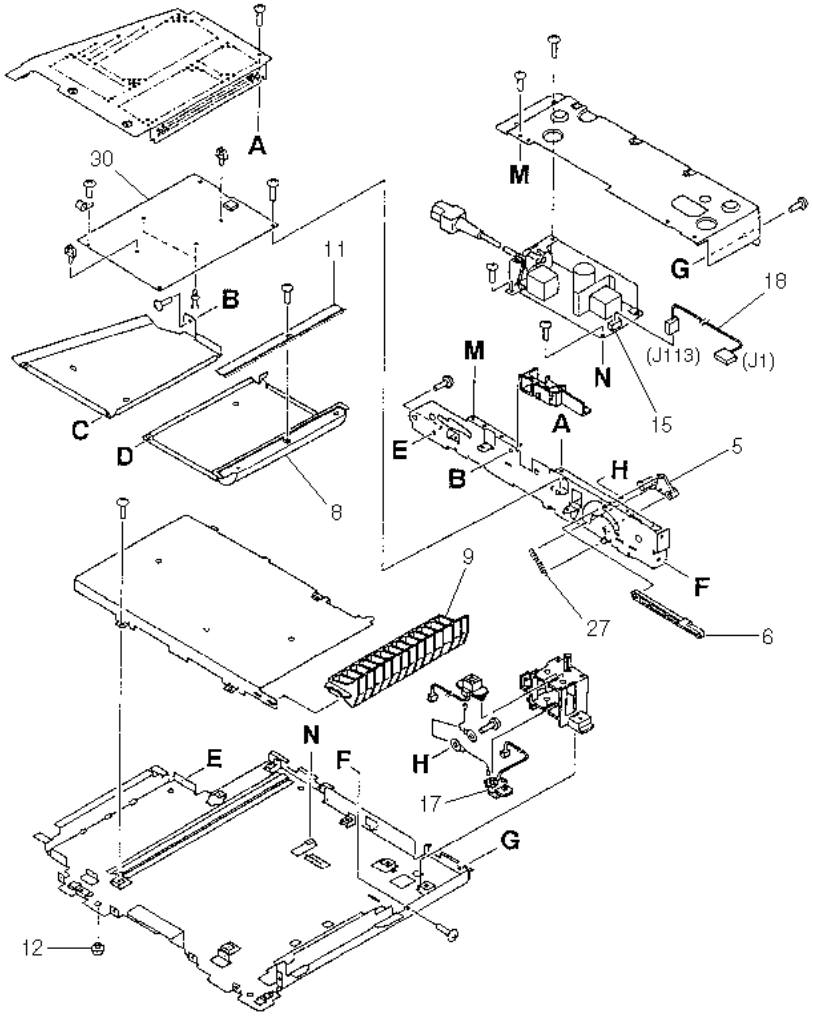


**Figure A-25a Duplex Feeder Assembly (1 of 2)**

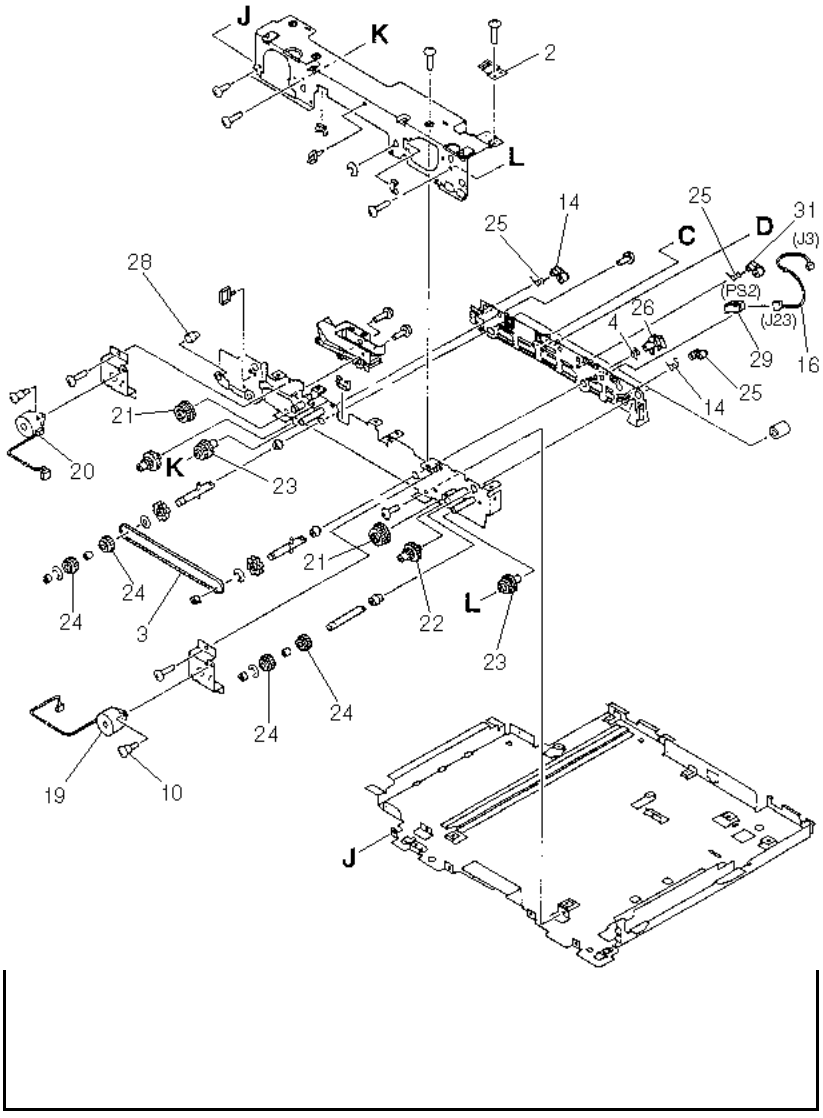


**Figure A-25b Duplex Feeder Assembly (2 of 2)**

## Table A-25 Duplex Feed Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RA2-2069-000CN | LJ4+/5 | PCA Shield Plate |
| 2 | RA2-2070-000CN | LJ4+/5 | Static Eliminator sml |
| 3 | RA2-2072-000CN | LJ4+/5 | Timing Belt |
| 4 | RA2-2076-000CN | LJ4+/5 | Sensor Arm |
| 5 | RA2-2078-000CN | LJ4+/5 | Rod Crank |
| 6 | RA2-2079-000CN | LJ4+/5 | Front Cover Rod |
| 7 | RA2-2081-000CN | LJ4+/5 | Hold Tray Rear Guide |
| 8 | RA2-2082-000CN | LJ4+/5 | Hold Tray Front Guide |
| 9 | RA2-2085-000CN | LJ4+/5 | Front Guide |
| 10 | RA2-2115-000CN | LJ4+/5 | Stepped Scr M3 by 6.5 |
| 11 | RA2-2126-000CN | LJ4+/5 | Static Eliminator |
| 12 | RB1-2114-000CN | LJ4+/5 | Foot (Qty 4) |
| 13 | RB1-2155-000CN | LJ4+/5 | Oblique Roller |
| 14 | RF1-3805-000CN | LJ4+/5 | Roller Holder (Qty 3) |
| 15 | RG1-3503-000CN | LJ4+/5 | Power Supply Assembly |
| 16 | RG1-3530-000CN | LJ4+/5 | Paper Pickup Cable |
| 17 | RG1-3531-000CN | LJ4+/5 | Paper Feed Cable |
| 18 | RG1-3533-000CN | LJ4+/5 | Power Supply Cable |
| 19 | RF1-3807-000CN<br>RF1-3815-000CN | LJ4+<br>LJ5 | Front Holding Tray Mtr (M1) |
| 20 | RF1-3804-000CN<br>RF1-3813-000CN | LJ4+<br>LJ5 | Rear Holding Tray Mtr (M3) |
| 21 | RS1-0586-000CN | LJ4+/5 | Gear 40T/24T (Qty 2) |
| 22 | RS1-0587-000CN | LJ4+/5 | Gear 24T/18T (Qty 2) |
| 23 | RS1-0588-000CN | LJ4+/5 | Gear 33T/20T (Qty 2) |
| 24 | RS1-0595-000CN | LJ4+/5 | Gear Roller (Qty 4) |

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 25 | RS1-2406-000CN | LJ4+/5 | Torsion Spring (Qty 3) |
| 26 | RS1-2407-000CN | LJ4+/5 | Torsion Spring |
| 27 | RS1-2409-000C N | LJ4+/5 | Tension Spring |
| 28 | RS1-7010-000CN | LJ4+/5 | Shaft |
| 29 | WG8-5210-000CN | LJ4+/5 | Photo Interrupter |
| 30 | RG1-3501-000CN<br>RG1-3582-000CN | LJ4+<br>LJ5 | Duplex Control PCA |
| 31 | RF1-3817-00017 | LJ5 | Duplex Roller Holder |

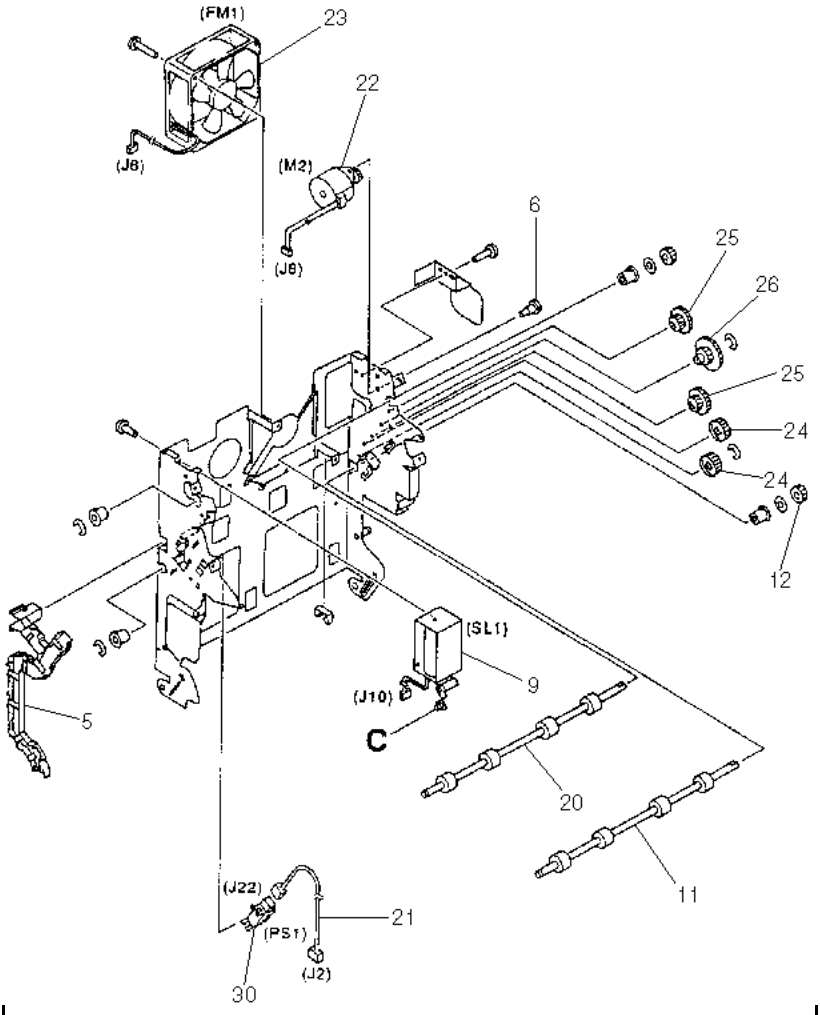


**Figure A-26a Duplex Switchback Assembly (1 of 2)**

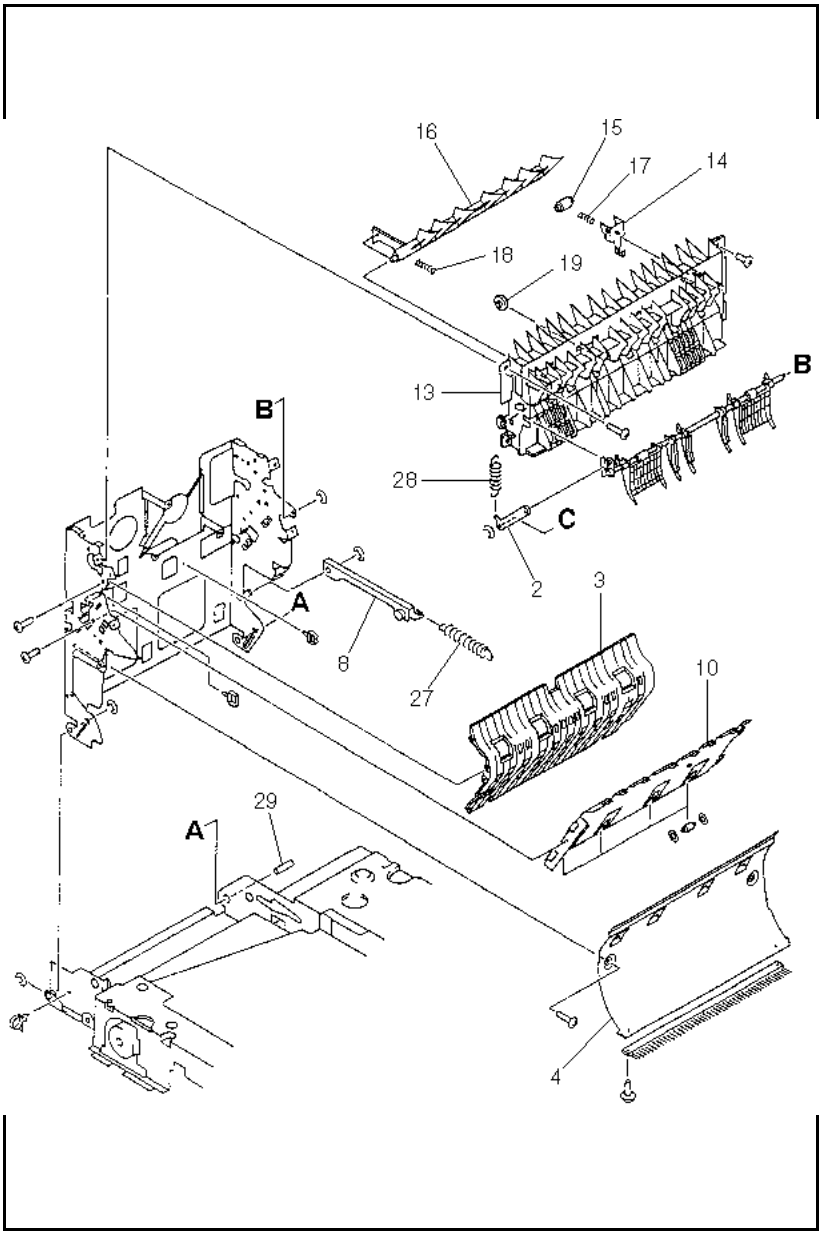


**Figure A-26b Duplex Switchback Assembly (2 of 2)**

## Table A-26 Duplex Switchback Assembly

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 1 | RA2-2083-000CN | LJ4+/5 | Static Eliminator |
| 2 | RA2-2087-000CN | LJ4+/5 | Deflector Linkage |
| 3 | RA2-2094-000CN | LJ4+/5 | Upper Feed Guide |
| 4 | RA2-2095-000CN | LJ4+/5 | Lower Feed Guide |
| 5 | RA2-2112-000CN | LJ4+/5 | Cable Cover |
| 6 | RA2-2116-000CN | LJ4+/5 | Stepped Screw 3 By 6.9 (Qty 2) |
| 7 | RA2-2119-000CN | LJ4+/5 | Paper Deflector |
| 8 | RF1-3806-000CN | LJ4+/5 | Holding Tray Linkage |
| 9 | RF1-3808-000CN | LJ4+/5 | Switchback Solenoid (SL1) |
| 10 | RF1-3811-000CN | LJ4+/5 | Paper Feed Guide |
| 11 | RA2-2118-000CN | LJ4+/5 | Paper Roller Shaft |
| 12 | RS1-0589-000CN | LJ4+/5 | Gear 22T (Qty 2) |
| 13 | RA2-2088-000CN | LJ4+/5 | Switchback Guide |
| 14 | RA2-2089-000CN | LJ4+/5 | Roller Holder (Qty 4) |
| 15 | RA2-2093-000CN | LJ4+/5 | Roller (Qty 4) |
| 16 | RA2-2090-000CN | LJ4+/5 | Switchback Deflector |
| 17 | RS1-2411-000CN | LJ4+/5 | Roller Holder Spring (Qty 4) |
| 18 | RS1-2412-000CN | LJ4+/5 | Deflector Spring (Qty 4) |
| 19 | RA2-2102-000CN | LJ4+/5 | Guide Roller (Qty 3) |
| 20 | RA2-2124-000CN | LJ4+/5 | Roller Shaft |
| 21 | RG1-3529-000CN | LJ4+/5 | Switchback Sensor Cbl |
| 22 | RF1-3801-000CN<br>RF1-3814-000CN | LJ4+<br>LJ5 | Switchback Stepper Mtr (M2) |
| 23 | RH7-2135-000CN | LJ4+/5 | Switchback Fan (FM1) |
| 24 | RS1-0590-000CN | LJ4+/5 | Gear 32T (Qty 2) |

| Ref | Part # | Notes | Description |
|---|---|---|---|
| 25 | RS1-0591-000CN | LJ4+/5 | Gear 39T/22T (Qty 2) |
| 26 | RS1-0592-000CN | LJ4+/5 | Gear 29T/54T |
| 27 | RS1-2408-000CN | LJ4+/5 | Switchback Tension Spring |
| 28 | RS1-2410-000CN | LJ4+/5 | Deflector Tension Spring |
| 29 | RS1-7009-000CN | LJ4+/5 | Switchback Hinge Pin |
| 30 | WG8-5210-000CN | LJ4+/5 | Photo Interrupter (PS1) |

# B

# LaserJet 5/5M/5N Printer

The Combined Service Manual contains information to be used with the LaserJet4/4+/4M/4M+/5/5M/5N. In special circumstances, the information in Chapters 1 and 3 will not pertain specifically to the LaserJet 5/5M/5N printer (such as the control panel information). This Appendix contains the information that is specific for the LaserJet 5/5M/5N printers.

The Product Information shows feature comparisons of the LaserJet 5/5M/5N with the LaserJet 4+/4M+ and a product compatibility matrix. Also included in this Appendix are specifications for the LaserJet 5/5M/5N, Related Documentation, Safety Information, Control Panel information, Service Mode instructions, PCL Self Test Printout information, and Infrared troubleshooting information.

Please note that if the information you are looking for is not found in this Appendix, please see Chapters 1 through 8, Appendix A, or the Service Notes section.

## Table B-1 Printer Features

| Features | HP LJ 4+ | HP LJ4M+ | HPLJ5 | HPLJ5M | HPLJ5N |
|---|---|---|---|---|---|
| Model | C2037A | C2039A | C3916A | C3917A | C3952A |
| Printer Speed | 12 ppm | 12 ppm | 12 ppm | 12 ppm | 12 ppm |
| Resolution | 300/600 dpi | 300/600 dpi | 300/600 dpi | 300/600 dpi | 300/600 dpi |
| Expandable I/O Buffer | Yes | Yes | Yes | Yes | Yes |
| Resource Savings | Yes | Yes | Yes | Yes | Yes |
| MEt | Yes | Yes | Yes | Yes | Yes |
| REt | Yes | Yes | Yes | Yes | Yes |
| Languages | Enhanced PCL5 | Enhanced PCL5, Postscript Level 2 | HP PCL 6 | HP PCL 6, Postscript Level 2 | HP PCL 6 |
| PostScript Upgradeable | C3129A* | N/A | C3918A | N/A | C3918A |
| Resident Memory | 2 MByte | 6 MByte | 2MByte | 4MByte | 2MByte |
| Printer Max. Memory Capacity | 66 MByte | 50 MByte | 66 MByte | 52 MByte | 66 MByte |
| Available Memory Slots | Four | Two ** | Four | Three | Four |
| PC Tray (Tray 2) Capacity | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets |
| MP Tray (Tray 1) Capacity | 100 Sheets | 100 Sheets | 100 Sheets | 100 Sheets | 100 Sheets |
| Output Capacity | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets | 250 Sheets |
| 500 Sheet Optional Feeder | C2083D | C2083D | C3921A | C3921A | C3921A |
| Duplex Option | C3157A | C3157A | C3920A | C3920A | C3920A |
| Envelope Feeder | C2082B | C2082B | C3927A | C3927A | C3927A |
| Typefaces | 45 PCL | 45 PCL 35 Postscript | 45 PCL FontSmart | 45 PCL 35 Postscript FontSmart | 45 PCL FontSmart |

| Features | HP LJ 4+ | HP LJ4M+ | HPLJ5 | HPLJ5M | HPLJ5N |
|---|---|---|---|---|---|
| Interfaces | Serial (9 pin)<br>Parallel | Serial (9 pin)<br>Parallel<br>Local Talk | Serial (9 pin)<br>Parallel<br>Local Talk<br>Ethernet<br>Serial Infrared*** | Serial (9 pin)<br>Parallel<br>Local Talk<br>Ethernet<br>Serial Infrared*** | Serial (9 pin)<br>Parallel<br>10-baseT<br>Serial Infrared*** |
| MIO Slots | 1 | 1 | 1 | 1 | 1 |
| EconoMode | Yes | Yes | Yes | Yes | Yes |
| Cartridge Slot | Yes | Yes | No | No | No |
| Power Save | Yes | Yes | Yes | Yes | Yes |
| Monthly Usage (pages) | Up to 20,000 | Up to 20,000 | Up to 35,000 | Up to 35,000 | Up to 35,000 |

*The PostScript upgrade requires an additional 4 MB SIMM.
**PostScript & Memory SIMM already occupy 2 slots.
***Requires C2929A IR transceiver pod.

## Product Family Information

The model HP C3916A, C3917A, and C3952A are very similar from a hardware service standpoint. The models HP C2039A and C3917A printers add the following features:

- PostScript Level 2 SIMM
- AppleTalk MIO Card
- 4 MBytes of RAM (2 MBytes for the C3917A)

The model HP C3952A adds a 10-baseT MIO card to the base C3916A printer.

In every instance the repair procedures for all LaserJet 4+ and LaserJet 5 printers products are very similar.

Some LaserJet 4+ accessories are compatible with the LaserJet 5/5M/5N and some are not. The compatibility chart below may be used when there is a question of accessory compatibility.

## Table B-2 Product Family Compatibility Matrix

| Accessory | Description | Work in the LaserJet 4? | Work in the LaserJet 4 Plus? | Work in the LaserJet 5? |
|---|---|---|---|---|
| C2082A | Envelope Feeder | Yes | No | No |
| C2082B | Envelope Feeder | Yes | Yes | No |
| C3927A | Envelope Feeder | No | No | Yes |
| C2083A | Optional 500 Sheet Feeder Assembly | Yes | No | No |
| C2083D | Optional 500 Sheet Feeder Assembly | Yes | Yes | No |
| C3921A | Optional 500 Sheet Feeder Assembly | No | No | Yes |
| C2085A | 250 Sheet Universal PC tray | Yes | No | No |
| C2085D | 250 Sheet Universal PC tray | No | Yes | No |
| C3924A | 250 Sheet Universal Tray 2 | No | No | Yes |
| C2080A | PostScript SIMM | Yes | No | No |
| C3129A | PostScript SIMM | No | Yes | No |
| C3918A | PostScript SIMM | No | No | Yes |
| C3930A | Flash SIMM 2 MB | No | No | Yes |
| C3931A | Flash SIMM 4 MB | No | No | Yes |
| C2063A | Memory (1 MByte) | Yes | Yes | Yes |
| C2064A | Memory (2 MByte) | Yes | Yes | Yes |
| C2065A | Memory (4 MByte) | Yes | Yes | Yes |
| C2066A | Memory (8 MByte) | Yes | Yes | Yes |
| C3130A * | Memory (1 MByte) | No | Yes | Yes |
| C3131A * | Memory (2 MByte) | No | Yes | Yes |
| C3132A* | Memory (4 MByte) | No | Yes | Yes |
| C3133A* | Memory (8 MByte) | No | Yes | Yes |
| C3146A * | Memory (16 MByte) | No | Yes | Yes |
| C3157A | Duplex Assembly | No | Yes | No |
| C3920A | Duplex Assembly | No | No | Yes |
| 92298A | Toner Cartridge | Yes | Yes | Yes |

*If HP LaserJet 4 Plus/5 Optional Memory (C3130A, C3131A, C3132A, C3133 or C3146A) is installed in the HP LaserJet 4, the printer will display a “53.1X.08 ERROR” (X indicates the position of the SIMMs slot).

# Identification

The model number is on a label placed on the outside, rear cover of the printer. The model number (C3916A, C3917A, or C3952A) is found at the top of the label. The model number is the base number for all printers.

The serial number contains information about the printer. The serial number Alpha section refers to the Country of Origin, the Revision Level and the Production Code. The Numeric section refers to the production number of the printer. See the following for information about the production codes.

A typical serial number would consist of: **CC R P XXXXXX**

| *Code* | *Meaning* |
|---|---|
| **CC** | Country of Origin |
| **R** | Revision Number - Alphanumeric, no vowels |
| **P** | Production Code - Alphanumeric, no vowels |
| **XXX-XXXX** | Numeric serial number - Numeric, no alphas |

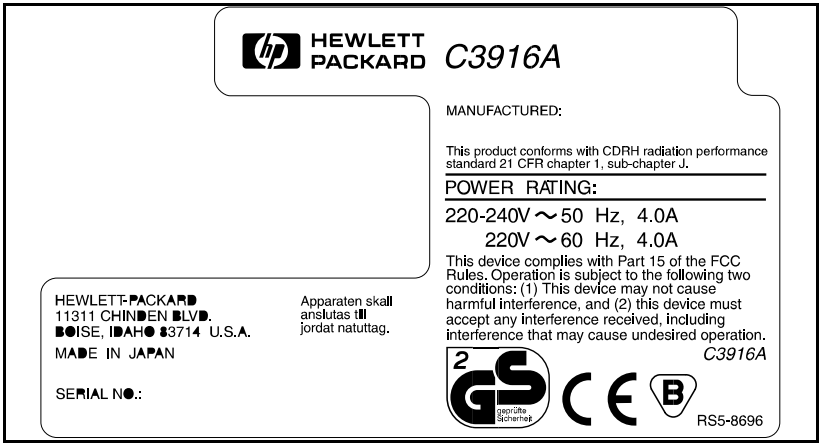
HEWLETT PACKARD
C3916A
MANUFACTURED:
This product conforms with CDRH radiation performance standard 21 CFR chapter 1, sub-chapter J.
POWER RATING:
220-240V ~ 50 Hz, 4.0A
220V ~ 60 Hz, 4.0A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
C3916A
HEWLETT-PACKARD
11311 CHINDEN BLVD.
BOISE, IDAHO 83714 U.S.A.
MADE IN JAPAN
SERIAL NO.:
Apparaten skall anslutas till jordat natuttag.
RS5-8696

**Figure B-1 Printer Identification Label for the HP LaserJet 5/5M/5N**

# Specifications

## HP LaserJet 5 / 5M / 5N

### Table B-3 Printer Dimensions

| Dimension | HP LaserJet 5 |
|---|---|
| Width | 16.4 in (415mm) |
| Depth | 15.9 in (403 mm) |
| Height | 11.7 in (297 mm) |
| Weight (with toner cartridge) | 37 lbs. (16.8 kg) |

### Table B-4 Power Specifications

| Volts | Freq | Watts (typical) | | |
|---|---|---|---|---|
| | | Printing | Standby | PowerSave |
| 100 Vac ± 10%<br>120 Vac ± 10% | 50/60 Hz ± 2 Hz<br>50/60 Hz ± 2 Hz | 290<br>290 | 100<br>100 | 18-24<br>18-24 |
| 220 Vac ± 10%<br>240Vac ± 10% | 50/60 Hz ± 2 Hz<br>50/60 Hz ± 2 Hz | 290<br>290 | 100<br>100 | 18-24<br>18-24 |

## Table B-6 Electrical Specifications

| Status | 100/115 V | 220/240 V |
|---|---|---|
| Recommended Minimum Circuit Capacity | 11.2 amps | 5.0 amps |
| Peak Inrush Current | 19-34 amps | 17-40amps |
| 25% Decay Time | 8.7-16.9 ms | 1.4-9.9 ms |
| Peak Fuser Current | 65-71 amps | 29-34 amps |
| Return-to Average Time | 375-475 ms | 220-300 ms |

## Table B-5 Environmental Specifications

| | |
|---|---|
| Operating Environment | **Temperature:** 10° C to 32.5° C (50° F to 90.5° F)<br>**Humidity:** 20-80% |
| Storage/Standby Environment (not including toner cartridge) | **Temperature:** 0° to 35° C (32° to 95°F)<br>**Humidity**: 10-95% |
| Maximum Duty Cycle | 35,000 pages per month |

# Related Documentation

The following manuals can be ordered from Hewlett-Packard's Support Materials Organization (SMO). The phone number for SMO is (800) 227-8164.

**Table B-7** Printer Documentation

| HP LaserJet 5/5M/5N Documents—Description | Part Number |
|---|---|
| Getting Started Guide for the HP LaserJet 5/5M/5N Printer | C3917-90901 |
| HP LaserJet 5/5M/5N User's Manual | C3916-90901 |
| HP PCL5 Printer Language Technical Reference Package | 5010-3994 |
| HPJet Direct Network Installation Guide | J2552-90011 |
| HPJet Direct Network Software Configuration Guide | J2552-90001 |
| PostScript SIMM Technical Reference Guide | C3918-90901 |

## Laser Statement (Sweden/Finland)

**LASERTURVALLISUUS**

**LUOKAN 1 LASERLAITE**
KLASS 1 LASER APPARAT

HP LaserJet(s) 5/5M/5N laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käytössä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Kirjoittimen on hyväksynyt Suomessa laserturvallisuuden osalta Sähkötarkastuskeskus. Laitteen turvallisuusluokka on määritetty valtioneuvoston päätöksen N:o 472/1985 ja standardin EN 60825 (1991) mukaisesti.

**VAROITUS !** Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

**VARNING !** Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

**HUOLTO** HP LaserJet (s)5/5M/5N Plus-kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

**VARO !**Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

**VARNING !**Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsättas användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 770-795 nm
Teho 5 mW
Luokan 3B laser

# Control Panel Layout

The LaserJet 5 control panel consists of a 16-character scrolling display panel and six keys, three of which have forward and backward scrolling functions. Figure B-2 shows the display panel.

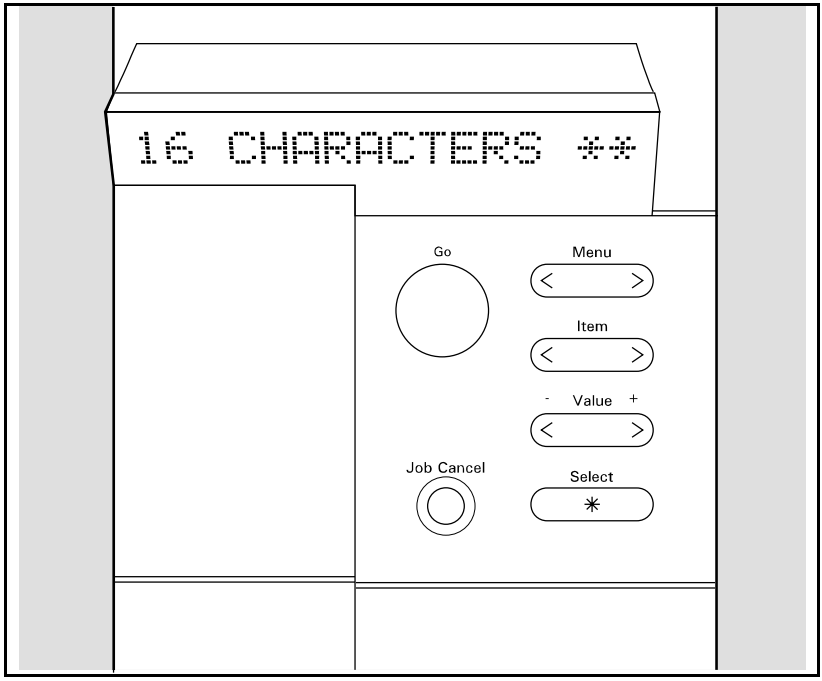


**Figure B-2 Control Panel Keys**

## Control Panel Keys

The table on the following page explains how the control panel keys work.

## Table B-8 Control Panel Keys

| Key | Explanation |
|---|---|
| **Go** | The **Go** key replaces the On Line, Form Feed, and Continue keys from previous HP LaserJet printers. The **Go** key performs five main functions:<br><br>Switches the state of communication between computer and printer either on (on line) or off (off line).<br><br>Prints any data remaining in printer's buffer. Does *not* send a blank sheet of paper through the printer.<br><br>Allows the printer to resume printing after a printer message (such as `20 MEM OVERFLOW`) has placed it off line. Clears most printer messages and places the printer back on line.<br><br>Overrides paper or envelope size selection regardless of size of media in Tray 1, optional Envelope Feeder, Tray 2, or Tray 3.<br><br>Overrides a request to manually feed paper or an envelope by selecting paper from the next available source instead. |
| **Job Cancel** | The **Job Cancel** key performs one function — deleting a print job from the printer:<br><br>Press **Job Cancel** to cancel a job that the printer is currently processing. The printer will display `CANCELING JOB`, clear the printer buffer, and return to a `READY state.`<br><br>`If` **Job Cancel** is accidentally pushed, the job must be reprinted. There is no undo function.<br><br>If **Job Cancel** is pushed when the printer is isle, `NO JOB TO CANCEL` will appear briefly, and then a `READY` display will reappear. |
| **Menu** | Press **Menu** to cycle through the control panel menus. Press the **>** end of the key to move forward through the menus. Press the **<** end of the key to move backward through the menus.<br><br>When an option is added to the printer (PostScript, for example), a menu for that option appears in the sequence. See "Control Panel Menus," in this chapter, for more information. |

| Key | Explanation |
|---|---|
| Item | Press Item to cycle through the selected menu's items. Press the > end of the key to move forward through the items. Press the < end of the key to move backward through the items.<br><br>Menu items vary depending on options installed and configuration of other menu choices. |
| - Value + | Press - Value + to cycle through the selected item's values. Press the > end of the key to move forward through the values. Press the < end of the key to move backward through the values. |
| Select | The Select key saves a control panel setting you selected. An asterisk (*) appears next to the saved selection, indicating that it is the default. Default settings remain in place when the printer is switched off or reset.<br><br>The Select key is also used when printing a test page or configuration page from the control panel. |

## Control Panel Menus

Figure B-3 shows the menus and menu items available with the basic printer configuration. Not all menu items are discussed in this section. Only those items of specific interest from a service standpoint, or items new to the printers are discussed in this section. If options such as PostScript or a different I/O are installed, the new menu items automatically are added at the appropriate location. For example, a PostScript Menu appears following the PCL Menu.

**To change a control panel setting:**

1 Press **Menu** repeatedly until the menu you want appears.
2 Press **Item** repeatedly until the item you want appears.
3 Press **-Value+** until the setting you want appears.
4 Press **Select** to save your selection.

**Note** An asterisk appears next to your selection in the display, indicating that it is now the default.

5 Press **Go** to exit the menu.

### Table B-9 Control Panel Menu for the HP LaserJet 5 (Refer to Figure B-3)

| Reference | Explanation |
|---|---|
| 1 | Printing Menu: Lists the current printing and PowerSave settings. |
| 2 | PCL Fonts Menu: Lists current font settings. |
| 3 | Postscript Menu: List current postscript settings. |
| 4 | Job Menu: Lists current settings for print resolution, personality, and I/O timeout. |
| 5 | Config Menu: List current internal configuration settings of the printer. |
| 6 | Mem. Config. Menu: Lists I/O buffer and resource saving buffer settings. |
| 7 | Parallel Menu: Lists current settings of the parallel port. |
| 8 | Serial Menu: Lists current settings of the serial port. |
| 9 | HP MIO Menu: Lists current settings of the MIO card. |
| 10 | Reset Menu: Lists reset options available. |
| 11 | Test Menu: Lists internal tests available. |

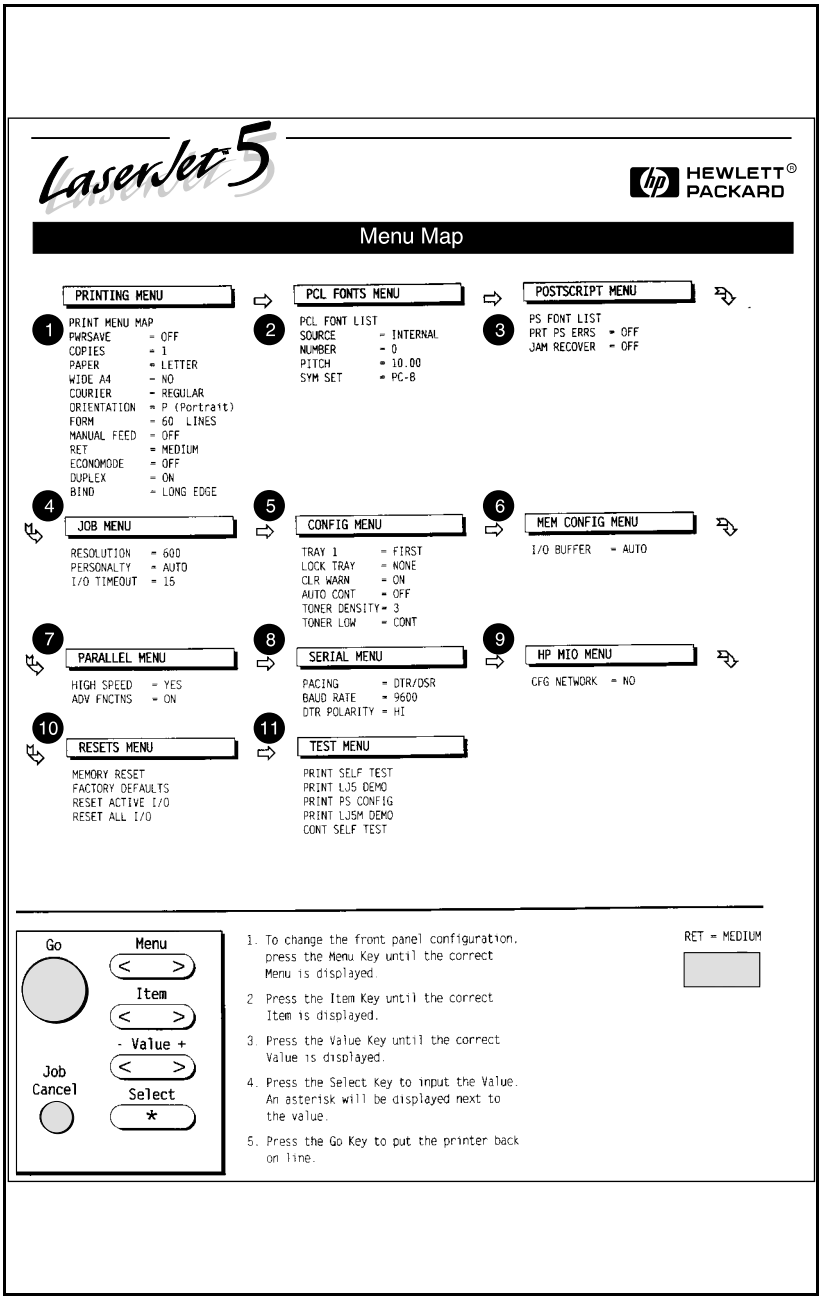


**Figure B-3 Control Panel Menu Map**

# Printing Menu

## TableB-10

### Printing Menu Items

| Item | Options | Explanation |
|---|---|---|
| PRINT MENU MAP | No options available | When PRINT MENU MAP is displayed, press Select to print a configuration page and a menu map. The message PRINTING CONFIGURATION PAGE is displayed. |
| PWRSAVE | OFF,<br>15 MIN,<br>30 MIN*,<br>1 HR,<br>2 HRS,<br>3 HRS | PWRSAVE stands for PowerSave. This menu item sets the amount of time you want the printer to be idle before the printer cools down. The printer automatically starts warming to printing temperature when a job is sent to the printer, a control panel key is pressed, paper is loaded or removed, or the top door is opened. |
| COPIES | 1* to 999 | Select any number from 1 to 999. Press - Value + once to change setting by increments of 1 or hold down to scroll by increments of 10. |
| PAPER<br><br><br><br>ENVELOPE | LETTER* (110V printers),<br>A4* (220V printers),<br>Executive,<br>Legal,<br>A5 (from Tray 1 only)<br>COM 10* (110V printers)<br>DL* (220V printers)<br>Monarch,<br>C5,<br>B5 | The default image size for paper or envelopes can be set with the control panel. |
| WIDE A4 | NO*<br>YES | Changes the number of characters that may be printed on a single line of A4 paper. For example, when set to NO, 78 10-pitch characters will be printed on one line. When set to YES, 80 10-pitch characters will be printed. |
| COURIER | REGULAR*<br><br><br>DARK | When set to REGULAR, the internal courier font is the same font used in the LaserJet series 4 printers. When set to DARK, the internal courier font is the same as the LaserJet series 3 printers. Both fonts are not available at the same time. |

* Indicates factory default.

| Item | Options | Explanation |
|---|---|---|
| ORIENTATION | P*<br>L | P stands for portrait (vertical) and L stands for landscape (horizontal) orientation of type on the page. |
| FORM<br>(5 TO 128 LINES) | 60* (110V printers)<br>64* (220V printers) | Sets vertical spacing, from 5 to 128 lines, for default paper size. Press - Value + once to change setting by increments of 1 or hold down to scroll by increments of 10. |
| MANUAL FEED | OFF*<br>ON | Available only through Tray 1. When Manual Feed is on and Tray 1 is empty, the printer goes off line when it receives a print job and displays MANUALLY FEED *media size*. |
| RET | OFF<br>LIGHT<br>MEDIUM*<br>DARK | Refines the print quality. |
| ECONOMODE | OFF*<br>ON | Reduces the amount of toner on the printer page when to set to ON. |
| DUPLEX | OFF*<br>ON | Determines whether printer prints on both sides (duplex ON) or one side (duplex OFF) of a sheet. |
| BIND | LONG EDGE*<br>SHORT EDGE | Determines orientation of print on the page when using a duplex unit. |

* Indicates factory default.

Shading denotes optional items.

# PCL Fonts Menu

## Table B-11 PCL Fonts Menu Items

| Item | Options | Explanation |
|---|---|---|
| PCL FONT LIST | No options available | Press **Select** to print a list of the PCL fonts. |
| SOURCE | INTERNAL*<br>SOFT<br>SLOT *N* | Internal fonts*<br>Permanent soft fonts<br>SIMM Module: n=slot number. Typefaces stored in one of the four ROM SIMM slots (SLOT=slot 1, for example). |
| FONT NUMBER | 0 to 999 | The printer assigns a number to each typeface and lists them on the PCL Font List, which you can print out. (See top row in table for how to print a PCL Font List.) The font number appears in the Font # column of the printout.<br><br>Defaults and other conditions are as follows:<br><br>Internal * 0* is the default<br>Soft 1* is the default. You can select from the control panel only a permanent soft font that is currently in the printer. Do not use the ID number of a downloaded soft font.<br>SLOT SIMM Module; n=SIMM slot (1-4). Typefaces stored in one of the four ROM SIMM slots (M1=FONT 1, for example). |
| PITCH<br>or<br><br>PT. SIZE | Pitch:<br>10.00*<br><br>Pt:<br>12.00* | Depends on the FONT SOURCE and FONT NUMBER you select. Press **- Value +** once to change setting by increments of .01 for pitch and .25 for point-size or hold down to scroll by increments of 1. |
| SYM SET | PC-8*<br>Many others | A unique grouping of all the characters in a font. |

* Indicates factory default.

## PostScript Menu

### Table B-12 PostScript Menu Items

| Item | Options | Explanation |
|---|---|---|
| PS FONT LIST | No options available | Press Select to print a list of the fonts. While the list is being printed, the message PRINTING FONT LIST is displayed. |
| PRT PS ERRS | OFF*<br>ON | PRT PS ERRS stands for PRINT POSTSCRIPT ERRORS. This setting allows PostScript error messages to be printed. |
| JAM RECOVER | OFF*<br>ON | PostScript can be set to automatically reprint jammed pages after a paper jam is cleared. |

* Indicates factory default.

Shading denotes optional items.

## Job Menu

### Table B-13 Job Menu Items

| Item | Options | Explanation |
|---|---|---|
| RESOLUTION | 300<br>600* | Sets the resolution. |
| PERSONALTY | AUTO*<br>PCL<br>POSTSCRIPT<br>(optional) | Sets the printer language, or allows it to be automatically set (AUTO) based upon PJL command or format of received data. |
| PAGEPROTCT | AUTO*<br>ON | Only seen after a 21 PAGE TOO COMPLEX, PRESS GO KEY error. Can be set to ON to eliminate errors. |
| IO TIMEOUT | 15*<br>(5 to 300) | Time, measured in seconds, that the printer waits before ending a print job. Press - Value + once to change setting by increments of 1 or hold down to scroll by increments of 10. |

* Indicates factory default.

# Configuration Menu

## Table B-14 Configuration Menu Items

| Item | Options | Explanation |
|---|---|---|
| TRAY 1 | FIRST* | When set to FIRST, Tray 1 is configured as the default tray and will be used first during printing if any media is loaded into the tray. TRAY 1=FIRST is not recommended for networked (shared) environments. |
| | CASSETTE | When set to CASSETTE, Tray 1 no longer operates as a universal tray. A paper size must be assigned to Tray 1 using the SIZE 1 option (the next item in the Configuration Menu when TRAY 1=CASSETTE.) This allows Tray 1 to be used as a reserved tray. When Tray 1 is set as a cassette, Tray 2 becomes the new default paper source. |
| SIZE 1 | LETTER* (110V printers)<br>A4* (220V printers)<br>Executive<br>Legal<br>A5<br>COM10<br>DL<br>Monarch<br>C5<br>B5 | This menu item only appears if TRAY 1 priority has been changed from the default FIRST setting to CASSETTE. This item is used to tell the printer what size media is loaded in Tray 1 (since it has no paper size sensing mechanism). |
| LOCK | NONE*<br>1 (Tray 1)<br>2 (Tray 2)<br>3 (Tray 3)<br>Envelope Feeders<br>(Combinations of the above) | NONE — No trays locked out<br>1 — Tray 1 is locked out.<br>2 — Tray 2 is locked out.<br>3 — Tray 3 is locked out.<br>2, 1 — Only Tray 3 is available<br>3, 1 — Only Tray 2 is available.<br>3, 2 — Only Tray 1 is available. |
| ENV FEED | COM 10*<br>DL<br>Monarch<br>C5<br>B5 | Only appears if the optional envelope feeder is installed in the printer. Used to designate the envelope size. |
| CLR WARN | ON* | Determines how long a clearable warning will be displayed on the control panel.<br><br>When set to ON, the warning is displayed until the Go key is pushed. |
| | JOB | If set to JOB, the warning will be displayed until the end of the print job in which it was generated. |

* Indicates factory default.

| Item | Options | Explanation |
|---|---|---|
| AUTO CONT | OFF* | Determines how the printer reacts to data errors and printer errors. When auto continue is set to OFF, the printer displays an error message and goes off line until you press Go. |
| | ON | When auto continue is set to ON, the printer displays a message and goes off line for about 10 seconds, then comes back on line.<br><br>If your printer is part of a network or remote spooling system, set auto continue to ON. |
| TONER DENSITY | 1<br>2<br>3*<br>4<br>5 | Determines the relative darkness of print on the paper; 1 being the lightest and 5 being the darkest. |
| LOW TONER | CONT* | If TONER LOW is set to CONT, the printer will remain on line and continue to print while the message is displayed. |
| | STOP | If TONER LOW is set to STOP, the printer will go off line and wait for further action. |

* Indicates factory default.

# Memory Configuration Menu

## Table B-15 Memory Configuration Menu Items

| Item | Options | Explanation |
|---|---|---|
| I/O BUFFER | AUTO* | Memory set aside for I/O buffering is automatically determined by the printer. |
| | OFF | No memory is set aside for I/O buffers. |
| | ON | Size can be manually adjusted. |
| I/O SIZE | 10K and up | When IO BUFFER is set to ON, this item appears in the menu. Press - Value + to add or reduce I/O buffer memory in increments of 0 KBytes up to 100 KBytes, then in 100 KByte increments. |
| RESRCSAVE | | Appears when a certain amount of memory and a personality SIMM are installed in the printer. Enables or disables Resource Saving. |
| | AUTO* | Printer automatically determines the amount of memory to allocate to each installed personality. |
| | OFF | No memory is allocated. |
| | ON | Additional memory management item selections appear. |
| PCL MEM<br>PS MEM | 0K and up | Increases memory for each installed personality. |

* Indicates factory default.

## Parallel Menu

### Table B-16 Parallel Menu Items

| Item | Options | Explanation |
|---|---|---|
| HIGH SPEED | | The speed at which data is transmitted to the printer. If the default value (YES) results in I/O errors or no communications, set this value to NO. |
| | YES* | Sets the parallel interface to run at a higher data rate |
| | NO | Sets the parallel interface to run at a slower speed. |
| ADV FNCTNS | ON*<br>OFF | ADV FNCTNS=ON enables bi-directional parallel communication, which allows your printer to send status readback messages to your computer. Setting advance functions to ON may slow personality switching. |

* Indicates factory default.

## Serial Menu

### Table B-17 Serial Menu Items

| Item | Options | Explanation |
|---|---|---|
| PACING | DTR/DSR*, | If the computer requires hardware flow control. |
| | XON/XOFF | If the computer requires software flow control. |
| BAUD RATE | 9600*<br>300 to 57600 | Tells the printer how fast information will be transferred from the computer to the printer. |
| ROBUST XON | ON* | Appears only when PACING is set to XON/XOFF. If it is set to ON, the printer sends an XON every one second until data is received when the printer is on line and when sufficient buffer space has become available. |
| | OFF | If it is set to OFF, the printer sends one XON when it can accept more data or when it is on line. |
| DTR POLARITY | HI*<br>LO | Determines whether pin 8 goes high or low to indicate the printer is ready to receive data. |

* Indicates factory default.

## Resets Menu

### Table B-18 Resets Menu Items

| Menu Selection | Printer Response | Explanation |
|---|---|---|
| MEMORY RESET | CLEARING MEMORY | Press **Select** to perform a MEMORY RESET. This will clear the printer buffer and return all printing environment parameters to those values set in the Control Panel menus. |
| FACTORY DEFAULT | FACTORY DEFAULTS BEING RESTORED | Press **Select** to perform FACTORY DEFAULT. This restores most of the printer's *factory default settings* and performs a memeory reset.<br><br>Items in the Config, Memory Configuration, Parallel, and Serial Menus are not reset. |

**Note** The control panel resets will clear all memory in the printer, while the Job Cancel feature only clears the current job.

## Test Menu

### Table B-19 Test Menu Items

| Item | Explanation |
|---|---|
| PRINT SELF TEST | When PRINT SELF TEST is displayed, press Select to print a self test. |
| PRINT LJ5 DEMO | Prints a page that illustrates the LJ5 printer features. |
| PRINT CONFIG | Prints a PostScript configuration page. |
| PRINT LJ5M DEMO | Prints a page that illustrates the LJ5M printer features. |
| CONT SELF TEST | Prints a series of PCL Configuration Pages. The display will continue to scroll the message CONTINUOUS TEST, PRESS JOB CANCEL KEY until Job Cancel is pressed. |

# Service Mode

The Service Mode should be used only by authorized service personnel. The following can be executed while in the Service Mode:

- Print a Service Mode Self Test.
- Verify the Page Count, (the page count also is displayed on the standard self test).
- Set the Page Count.
- Set the Cold Reset Default (This sets the factory default paper size. Use when replacing non-U.S. Formatters).
- Set the Diagnostic Functions *ON* or *OFF* (for software developers use only).
- Demo Page=On/Off. Removes the Demo Page option from the self test menu.
- BIG Data=On/Off. Setting BIG Data to ON increases the size of the printer's status Readback Buffer.

Service Mode has messages only in English. However, certain messages (i.e. "PCL CONFIG PAGE") that are used in user-mode and in service-mode, are displayed in the selected display language while in Service Mode.

The following procedure is used to initiate the Service Mode.

1 Hold down the Menu+ and Value+ keys while powering ON the printer. Hold the keys down until `SERVICE MODE` is displayed.
2 The interrupted power-on self test is resumed. If the test completes successfully, the message `SERVICE MODE` is displayed.

To exit Service Mode, press the Go key.

* Indicates factory default.

## Setting the Page Count

The page count is stored in the printer's Non-Volatile Memory (NVRAM). If it is necessary to replace the Formatter PCA, the page count should be reset to the printer's original page count to reflect the age of the print engine. Use the following procedure to set the page count:

1. Enter the Service Mode as described previously.
2. When SERVICE MODE is displayed, press the **Menu+** key to access the Service Menu. Press the **Item+** key to step through the menu.
3. PAGES=XXXXXX is displayed. XXXXXX represents the page count currently stored in the printer's NVRAM. The underlined character denotes the cursor position.
4. Press the **Value+** or **Value-** key to change the value of the selected digit. Holding down the key scrolls through the values for the digit at approximately 5 values per second.
5. Press the **Select** key to select the correct value. The cursor automatically advances to the next digit.
6. Set each digit in the same manner. When the last digit's value has been entered, the printer automatically returns to SERVICE MODE.
7. Press the **Go** key one more time to exit Service Mode.

## Setting the Cold Reset Default

A Cold Reset procedure returns most user-selectable Control Panel Menu selections to their factory defaults, including Paper Size and Tray 1 Size settings. All 220/240 printers are set from the factory to default to A4 paper size settings when the user performs either a Cold Reset or Factory Default Reset procedure. However, when a Formatter is replaced after leaving the factory (due to a need for service), a Cold Reset or Factory Default Reset will result in apaper size of Letter for the default paper size.

To reset the default Cold Reset (and Factory Default Reset) paper size value to A4:

**1** Enter the Service Mode as described previously.
**2** Press the **Menu** key to display `SERVICE MENU`.
**3** Press the **Item** key to display `CR PAPER=LETTER`
**4** Press the **Value+/-** key to toggle between Letter and A4 paper.
**5** Press the **Select** key to save your selection.
**6** Press **Go** to exit the Service Mode.

For more information regarding the Cold Reset procedure, refer to Chapter 3 of this manual.

## Skip Demo

If set to TRUE, will disable any test and demo pages containing the HP logo. This setting should only be used by OEMs not wishing to give user-access to these pages.

## Big Data

This item will allow a user to increase the amount of status readback buffer if the item is set to ON. The default for this item is OFF. The printer must be power-cycled after changing this value in order for the new buffer size to take effect.

## Diagnostics

Allows a diagnostic mode for firmware developers. Should always be set to OFF (default value).

# Programming a Flash SIMM

A flash SIMM may be programmed while installed in the printer. To program a flash SIMM.

1 Hold down the Menu> , Item< , Value+ , and Select keys while powering on the printer.
2 The printer will display "PROGRAM SLOT 4". To change the slot number, press Value+/-.
3 Once the desired slot number is displayed, press Select.
4 The printer will display "OK", followed by "ERASING SIMM." If the SIMM is correcly earased, the printer will display "START DOWNLOAD." At this point, you may send the binary file to be flashed to the printer.
5 The 16 characters on the VFD will flash until the download is completed. When the download is completed, power cycle the printer.

## Changing the Control Panel Display Language

The default control panel display language is set for English. Supported languages are: English, French, German, Italian, Spanish, Finnish, Danish, Dutch, Swedish, Norwegian, Turkish, Polish, and Portuguese. Follow these instructions to change the display language.

1 Switch OFF the printer.
2 Press and hold **Select** while switching the printer ON until `SELECT LANGUAGE` appears in the display.
3 After the power-on self test, `LANG=ENGLISH` appears. Press **Value+/-** until the desired language appears in the display.
4 Press **Select** to save your choice. An asterisk (*)appears next to the language to indicate it is now the default.
5 Press **Go**. The On Line indicator is lit, and display messages are now in the language you selected.

**Note** If the display language is changed, replace or install the Control Panel Overlay to match the selected language. See the index to Chapter 6 for instructions on changing or installing the Control Panel Overlay and Chapter 8 for applicable part numbers.

# NVRAM Init

NVRAM Init clears the NVRAM to its initial state. This reset is used when the NVRAM becomes full and the user would like to add additional personalities. It is possible to reconfigure the NVRAM so the new personalities have higher priority and the older personalities, while they can still be run with factory defaults, run without NVRAM. This is done by clearing the NVRAM and then adding the new personalities before adding the older personalities.

To perform a NVRAM init, hold down the JOB CANCEL key while power cycling the printer. The English message, "NVRAM INIT" will be displayed briefly and the NVRAM will be initialized before the rest of the system comes up. Once the power-on self test is finished, the message "RESTORING FACTORY SETTINGS" will scroll.

**Note** The NVRAM init set the page count back to zero and all other SERVICE MODE settings to defaults, so it is necessary to reconfigure after performing this initialization. It also sets the Tray 1 size to Letter, the envelope feeder to COM10, and the display language to English.

# Understanding the PCL Self Test Printout

### Table B-20 Self Test Printout Items for the HP LaserJet 5

| Reference | Explanation (Refer to Figure B-4) |
|---|---|
| 1 | Printer Information lists printer specific statistics.<br><br>Formatter Number shows the unique number assigned to the formatter board.<br><br>Firmware Datecode is the eight-digit date (YYYYMMDD) code of the Formatter ROM.<br><br>Page Count shows the number of pages the printer has printed. |
| 2 | Installed Personalities and Options lists printer languages and all SIMM accessories that are installed. |
| 3 | Security lists whether the control panel is locked and whether the control panel has a security password. |
| 4 | Memory shows the total amount of installed memory, and indicates the amount of available memory for PCL applications (such as font downloading software). Information about the current I/O Buffering and Resource Saving configuration appears here. If the printer does not have enough memory installed to enable these two features, the amount of additional memory needed appears. |
| 5 | Paper Handling Options list the installed paper handling accessories. These accessories may include the Duplex Unit, Envelope Feeder, and the 500 sheet Lower Cassette (Tray 3). |
| 6 | HP MIO information is reserved for the HP MIO and network statistics. For some installed MIO options, this block of information can be as long as 20 lines and three columns. |

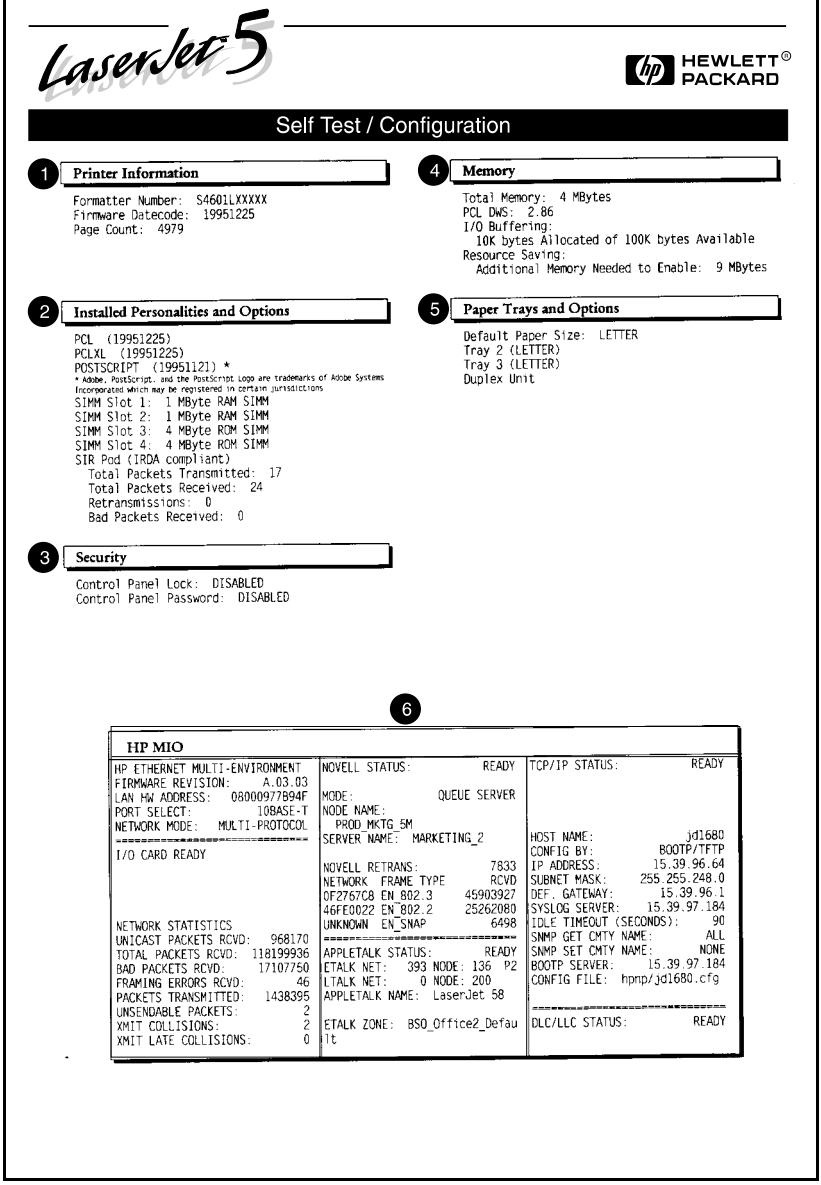


**Figure B-4 HP LaserJet 5 PCL Self Test Printout**

# Infrared Communication

The HP LaserJet 5, 5M, and 5N printers are equipped with an Infrared Datalink Association (IrDA) compliant port. The IrDA specification allows “wireless” transmission of print data between a wide variety of hosts (primary) and peripheral (secondary) devices. A primary device — such as a PC or laptop computer — is capable of reading and writing data to another primary device or writing to a secondary device, such as a printer. Secondary devices are read-only; they cannot initiate their own communication, and can only respond to a host command when properly addressed.

The IrDA protocol uses a transceiver chip in both devices to send and receive data packets. The packets are checked for validity, and a response is sent by the secondary device indicating whether the packets were complete or in error.

The IrDA protocol is contained in three layers:

- The physical electronics are the hardware elements in each device for sending and receiving the data.
- The Link Access Protocol (LAP) layer controls the physical layer, packetizes/unpacketizes data, and sets transmission rates.
- The Link Management Protocol (LMP) layer routes data to and from the host operating system (DOS/Windows).

The data flow is shown in Figure B-5.

The LAP and LMP layers can reside in either firmware, software, or a combination of both. There are different LAP and LMP protocols for primary and secondary devices.

The HP LaserJet 5 printer has the complete secondary protocol, and any host trying to communicate via the infrared (IR) port must have the complete primary protocol installed. The primary protocol software is the responsibility of the host supplier. It is not provided by Hewlett-Packard with the printer.

IrDA host (or primary device) communications can be obtained either via an internal IR port or an external IR accessory. Several manufacturers offer complete accessory upgrades for both host and peripheral devices.

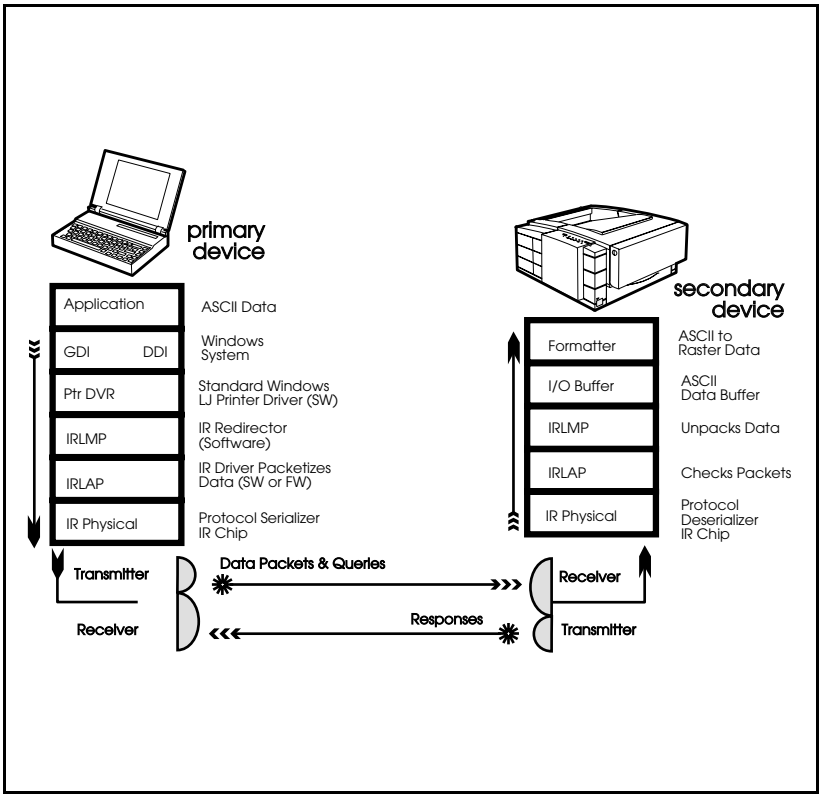


**Figure B-5 IR Data Flow**

### System Requirements

- Hardware
- Both the primary and secondary devices must be equipped with an IrDA-compliant IR component. Older, non-IrDA-compliant devices may not be compatible with the HP LaserJet 5/5M/5N printers.
- Software
- The primary device must be loaded during boot-up with software provided by the manufacturer for infrared operation.
- The primary device must be properly configured with an infrared COM port, IRQ level, and base address value.
- The infrared port must be installed and selected in the Printers section of the Windows Control Panel.
- The SIR transceiver pod (C2929A) accessory must be purchased for the LaserJet 5, 5M, or 5N printer.

## To Print Using the Infrared Port

The C2929A Infrared Transceiver must be plugged into the infrared (IR) port on your HP LaserJet 5, 5M, or 5N printer, located at the rear of the printer (Figure B-6). This port is compliant with the specifications determined by the Infrared Data Association (IrDA). On top of the transceiver pod is a status light that indicates when the port is activated. To use the IR port, you need to use a portable device that also includes an IrDA-compliant IR port and be within the range of operation (see Figure B-7).

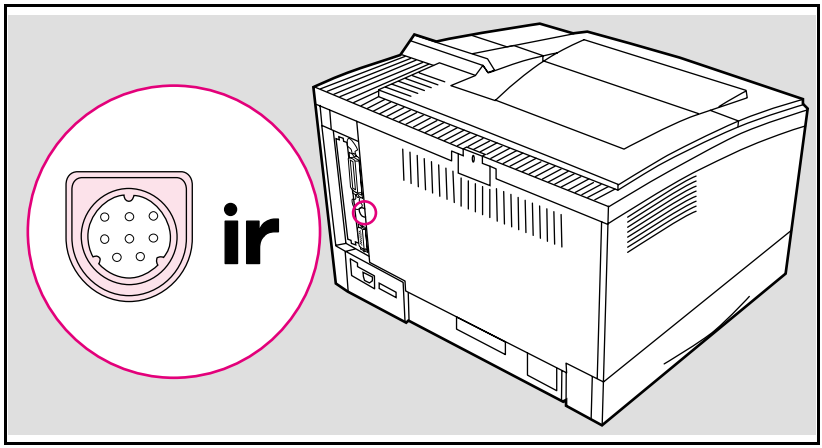


Figure B-6 IrDA Port Location

The IR port is compatible with a wide variety of IrDA-compliant portable devices; however, the method for printing will vary depending on the type of device and the operating system in use. Refer to the instruction manual for your portable equipment for specific instructions on printing from that device.

The IR port works by receiving data similarly to a serial port, however, without a cable and operates at speeds of up to 115 k bits per second. When the IR connection is established, the status light comes on. If the connection is broken or when the print job is complete, the status light goes off.

1 Make sure the printer is in Ready Mode.
2 Align your laptop computer (or other portable equipment) that is equipped with an IrDA-compliant IR port within 3 feet (1 m) of the IR pod and at an angle of plus or minus 15 degrees to ensure printing (Figure B-5).

3 Send the print job. The status light on top of the IR pod turns on. (Printing a complex document or using a software print spooler on your PC may delay the time it takes for the IR status light to turn on.) If the status light does not turn on, realign the port on your portable equipment with the pod, resend the print job and stay within the range of operation during printing.

4 If you have to move the device, for example, to add paper, make sure you stay within the range of operation to maintain the connection. If the connection is interrupted before your print job is complete, the IR port status light will turn off. You have from 3 to 40 seconds (depending on the host implementation) to correct the interruption and continue the job. In this case, the IR port status light turns back on.

5 The connection can be permanently broken (interrupted for more than 3 to 40 seconds) if the "sending" IR port is moved out of the range of operation or if anything passes between the two ports to block the transmission, such as a hand or piece of paper, or even direct sunlight. In this case, the job needs to be reprinted.

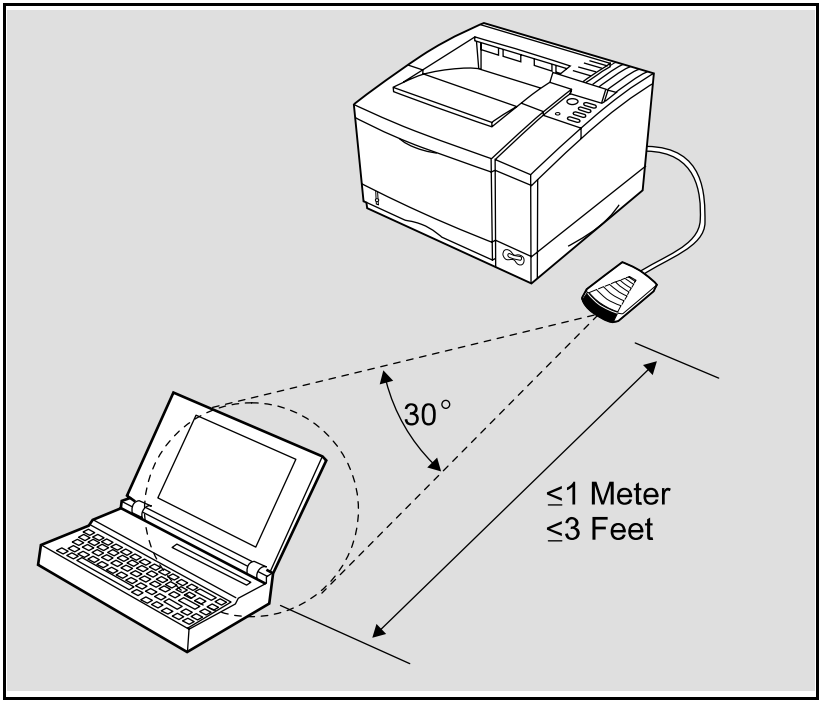


Figure B-7 IrDa Port Ranges

If you still have problems printing, make sure you are using an IrDA-compliant device and proper software and have selected the proper port for printing.

**Note** The IrDA standard for infrared communications represents an emerging technology. Older non-IrDA-compliant portable devices may not be compatible with your HP LaserJet 5/5M/5N printer. If you continue to have problems printing using the IR port, contact the manufacturer or dealer where you purchased your portable device to verify compatibility with the IrDA standard, and follow the troubleshooting procedure immediately following.

## Troubleshooting IR Printing Problems

IR printing problems may be caused by any of the several system components or by lack of proper configuration. The following checklist will help determine the source of the problem.

1. Verify the user is operating the printer and PC as described in the User's Manual: less than one meter between devices, and not more than plus or minus 15 degrees from direct center.
2. Verify the host PC or laptop and the printer are IrDA-compliant and have the necessary hardware components for IR communication.
3. Verify the IR software has been loaded on the primary device. (This is system software and should be available from the PC manufacturer.)
4. Verify the host PC or laptop is properly configured. Check the port assignment, the IRQ level, and the base address value. Check both the DOS AUTOEXEC.BAT and CONFIG.SYS files, and the Windows system configuration.

If all these elements are properly installed and configured, use the IR test tool to test the IrDA protocol transmission and device operation. This tool for troubleshooting IR communication problems, shown in Figure 10, has been developed by Genoa Technology, Inc., in cooperation with Hewlett-Packard. The part number is 5062-4661 and can be ordered through HP Parts Direct Ordering.

The IR test tool can be used with any IrDA-compliant primary or secondary device, regardless of manufacturer.

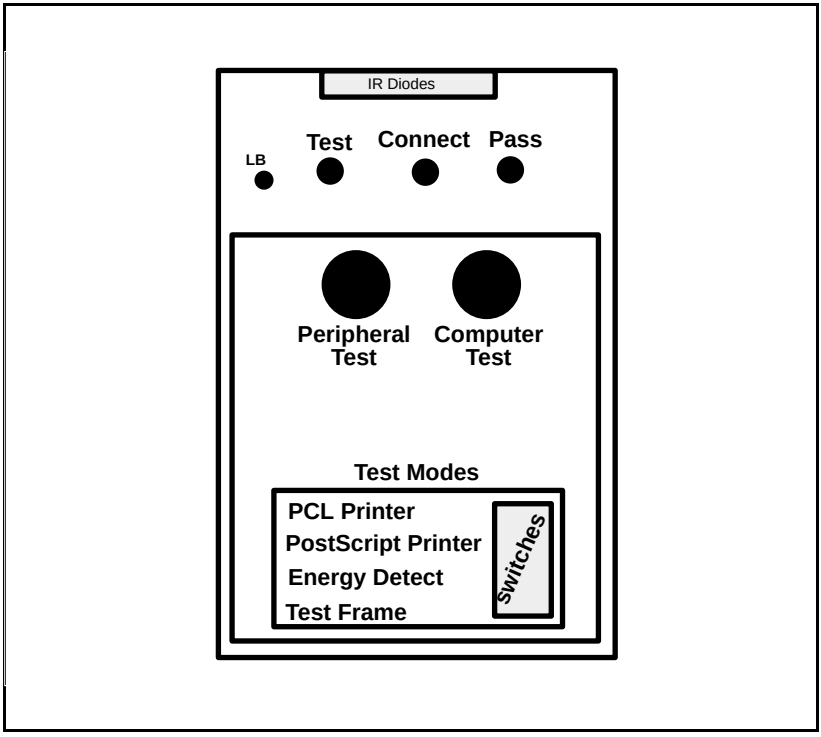


**Figure B-8 Infrared Test Tool**

To test the peripheral device:

1 Put the HP LaserJet 5 in Ready Mode.
2 Press the “Peripheral Test” button on the test tool. The LEDs on the test tool will sequence.

If the “PASS” LED lights, the test was successful, indicating that communication with the printer’s IR port is functioning normally.

On HP Laser-Jet printers, a self-test page will be initiated by the test.

If the “TEST” LED goes out and the “PASS” LED  fails to light, the printer’s IR port is not functioning correctly; check the operator’s instructions included with the IR test tool.

To test the host computer:

**1** Place the test tool on a table in front of the PC’s IR port.
**2** Press the “computer Test button.  The test tool will sequence the LEDs.

If the “PASS” LED  light, the test was successful, indicating that communication with the printer’s IR port is functioning normally.

If the “TEST” LED goes out and the “PASS” LED fails to light, the host’s IR port is not functioning correctly.

## Infrared Port Not Responding

### Table B-21 Solutions for Infrared Not Responding

| Situation | Solution |
|---|---|
| The connection cannot be established or the transmission seems to be taking longer than usual. | Make sure the device you are using is IrDA-compliant; look for an IrDA symbol on the device or refer to the manual for the device for IrDA specifications.<br><br>Make sure that the operating system on your computer includes an IR driver and your application uses a HP LaserJet 5/5M/5N compatible printer driver.<br><br>Make sure you have positioned the device within the range of operation and that no objects, such as a finger, paper, books, or bright light, are interfering with the connection. Also make sure the two IR ports are clean (free from dirt and grease.)<br><br>Bright light of any kind (sunlight, incandescent light, fluorescent light, or light from an infrared remote control, such as those used for TVs and VCRs) shining directly into one of the IR ports may cause interference.<br><br>Position the device closer to the printer's IR pod. |

| Situation | Solution |
|---|---|
| The printer prints only part of a page or document. | The connection has been broken during transmission. If you move the portable device during transmission, the connection can be broken. IrDA-compliant devices are designed to recover from temporary connection interruptions. Re-establish the connection (depending on the device you are using, you can have anywhere from 3 to 20 seconds to re-establish the connection) |
| The print job has been properly sent to the printer, but the printer will not print. | If the connection is broken before the entire print job has been transmitted to the printer (printing has not yet started), the printer may not print any of the job. If the Data light is on, press the **Job Cancel** button to clear the printer's memory. Then, position the device within the range of operation, and print the job again. |
| The IR status light turns off during transmission. | The connection may have been broken If the Data light is on, press the **Job Canel** button to clear the printer's memory. Then, position the device within the range of operation, and print the job again. |

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# S E R V I C E N O T E

SUPERSEDES None

## HP LaserJet 4/4M Printers

**LaserJet 4/4M printer ERROR 13 AND 41.3 messages:**
**Media Installation Instruction for the 250 Sheet Paper Cassette and the 500 Sheet Lower Cassette.**

**Serial Numbers:** n/a

**Background:**
The HP LaserJet 4/4M printers are less tolerant than its predecessors when feeding out-of-spec, damaged, or improperly manufactured paper. Marginal or out-of-spec media that would feed through a LaserJet II or a LaserJet III may not perform as well in a LaserJet 4/4M.

To obtain optimum results, Hewlett-Packard recommends the use of high quality paper designed for use in laser printers or photocopiers. It is important for print media and environmental conditions to fall within the printer's published specifications. For situations where questionable media is being used or where environmental specifications are not followed, the results may be less than optimal. These less than optimal results are most commonly reported as ERROR 13 and ERROR 41.3 messages. Two different situations exist that may produce these errors. One is when feeding paper from the optional 500 sheet lower cassette and the other is when using the standard 250 sheet paper cassette.

**Solution:**
Some general paper installations instructions apply to both the lower cassette and the paper cassette. Other instructions apply specifically to one tray or the other.

**Paper Installation Instructions for Both the Lower Cassette and the Paper Cassette:**

1. Make sure that the paper fits the specifications listed in the LaserJet 4/4M User's Manual or the Paper Specifications guide. Multi-feeds (ERROR 41.3) and paper

DATE 19 November 1993

ADMINISTRATIVE INFORMATION

| SERVICE NOTE CLASSIFICATION: | | |
|---|---|---|
| **INFORMATION ONLY** | | |
| AUTHOR: | ENTITY: | ADDITIONAL INFORMATION: |
| KLB | 4600 | |

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jams (ERROR 13) are commonly caused by paper that is too heavy, rough, smooth, or otherwise does not adhere to the printer's specifications.

2. Do not feed paper through the printer more than one time. After the page has passed through the printer once the moisture content of the paper has decreased and static will be more prevalent. This can lead to paper handling problems.

3. When filling the tray adhere to the following steps:

   a. Make sure the paper is resting flush against the rear of the tray.

   b. Verify that the paper is under the corner tab in the front left corner of the tray.

   c. Only refill the tray when it is empty and do not place multiple weights or types of media in the tray at the same time. Load the paper in a continuous stack. Do not fill the tray with numerous, small stacks.

   d. Do not shuffle or fan the paper. you may "flex" the stack by holding both ends and bending it in the middle.

**Optional 500 Sheet Lower Cassette Paper Installation Instructions:**

1. Adjust the rear paper guide to the size of media you will be using.

2. Do not overfill the tray. On the rear paper guide you will see 3 small arrows. Do not fill the tray above the bottom of these arrows.

3. Adjust the spring tension. When looking down at the lower cassette you will notice two green knobs. One of these knobs is for paper size. Adjust it to the size of the media that you are using. The other knob is for spring tension. It is extremely important, for optimal performance, that the tension is set correctly. When the tension is adjusted properly the purple indicator will be centered in the slot located to the left of the green knobs.

   To adjust the tension, lightly tap the front edge of the paper in the tray. The paper will bounce and then settle. If the indicator is not in the center of the slot, turn the green tension knob and then tap the paper once again. Repeat these steps until the indicator is centered in the slot. This process should be repeated whenever the tray is refilled. Note that if the indicator behaves erratically, the paper may not be flush against the rear paper guide. Push the paper to the rear and try again.

4. Adjust the right side paper guide so that it is flush against the edge of the paper.

**250 Sheet Paper Cassette Media Installation Instructions**

1. Do not overfill the tray. There are 3 small arrows on the inside of the tray towards the rear left corner. Do not fill the paper cassette above the bottom of these arrows.

C2001A-02
C2021A-02

# S E R V I C E N O T E

SUPERSEDES None

## HP LaserJet 4/4M printer

**ERROR 13 AND 41.3 messages: Corner Tab installation instructions**

**Serial Numbers:** n/a

**Background:**

The HP LaserJet 4/4M printer may be less tolerant than its predecessors when feeding out-of-spec, damaged, or improperly manufactured paper. To obtain optimum results, Hewlett-Packard recommends the use of high quality paper designed for use in laser printers or photocopiers. It is important for print media and environmental conditions to fall within the printer's published specifications. For situations where questionable media is being used or where environmental specifications are not followed, the results may be less than optimal. These less than optimal results are most commonly reported as ERROR 13 (Paper Jam) and ERROR 41.3 (Multi-feed) messages or as multi-feeds with no error displayed.

**Solution:**

The print media that is being used has a large effect on the number of errors observed. Different print media should always be tested when possible. If the media is out of the printer's specifications then paper feeding problems may occur. If the printer is displaying ERROR 41.3 or ERROR 13 messages resulting from multi-feeds, the paper being used is 16-20 lb. (60-75 g/m^2) and the errors are occurring when using the 250 sheet paper cassette then the following statements apply:

The HP LaserJet 4/4M printer was designed to accommodate a large variety of print media. Hewlett-Packard has developed a modification to

DATE 14 January 1994

ADMINISTRATIVE INFORMATION

| SERVICE NOTE CLASSIFICATION: **MODIFICATION AVAILABLE** | | |
|---|---|---|
| ACTION CATEGORY: | **AGREEABLE TIME** | ■ PERFORMANCE ENHANCEMENT<br>□ SERVICE/RELIABILITY ENHANCEMENT |
| LOCATION CATEGORY: | ■ CUSTOMER INSTALLABLE<br>□ ON-SITE<br>□ HP LOCATION | AVAILABLE UNTIL: 14 January 1995 |
| AUTHOR: KLB | ENTITY: 4600 | ADDITIONAL INFORMATION: |

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help increase the paper feeding performance on lighter weight (i.e., 16-20 lb. or 60-75 g/m^2) papers when the print media is being pulled from the 250 sheet paper cassette. This modified corner tab, p/n RA2- 1999-000CN, can easily be installed into the 250 sheet paper cassette. Hewlett-Packard's support providers should obtain the modified corner tab from Support Materials Organization (SMO) or from Support Materials Europe (SME). Customers may obtain the corner tab free of charge by calling HP Distribution at (303)-339-7009 when in the United States or from the European Customer Support Center (ECSC) at the following numbers when in Europe:

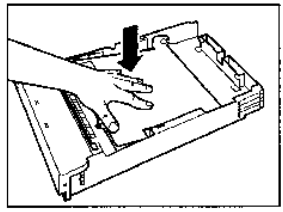
Language:

| | |
|---|---|
| English | (+31)-20-682-8291 |
| Dutch | (+31)-20-681-6473 |
| French | (+31)-20-681-8260 |
| German | (+31)-20-681-7174 |

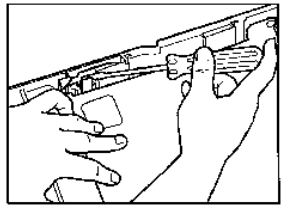
Installation of the modified corner tab does improve the paper-feeding performance of lighter weight papers in most cases.

**Installation Instructions for the Modified Corner Tab:**

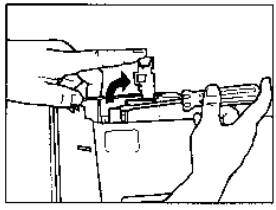
1. Remove paper and push down on the tray lift plate.



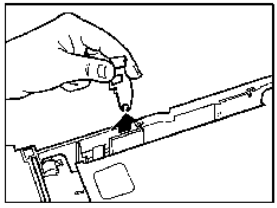
2. Pull the plastic tab retaining the metal corner tab toward the center of the tray.



3. Rotate the old corner tab slightly and lift it off of the mounting pin.



4. Reverse the procedure to install the replacement corner tab.



These corner tabs may not solve all paper feeding problems. They are designed to reduce multi-feeds and ERROR 41.3 messages associated with lightweight paper (i.e. 16-20 lb. or 60-75 g/m^2) but may not overcome paper problems that would otherwise cause paper handling issues. The original tabs should be retained for use with heavier print media.

**C2001A-03**
**C2021A-03**

# S E R V I C E N O T E

SUPERSEDES None

## HP LaserJet 4/4M printer

**Serial Numbers:** USBB074298-USBB081811
USBB099540-USBB190983
USBC085451-USBC093129
USBC112090-USBC234957
USTB000101-USTB007397
USTC000101-USTC010123

**LaserJet 4/4M paper jams in output assembly**

**Situation:**

A change in the manufacturing process increased the potential for an accordion jam. An accordion jam is a paper jam that typically occurs on the last few inches of the page causing the page to be folded like a fan. Only US made printers in the serial number range listed above were affected by this change. Some types of paper tend to interfere with the output roller holders during output causing a jam to occur. The printer keeps trying to push the page out causing the page to be folded. This is called an accordion jam.

**Solution:**

If paper is jamming in the printer it does not necessarily mean that replacing the output roller holders will cure the problem. The situation needs to be qualified before the rollers are replaced. When an accordion jam occurs

DATE 14 January 1994

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

**MODIFICATION RECOMMENDED**

| | | | | |
|---|---|---|---|---|
| ACTION CATEGORY: | ☐ IMMEDIATELY<br>■ ON SPECIFIED FAILURE<br>☐ AGREEABLE TIME | STANDARDS: LABOR: 0.5 hours + parts<br>No Travel Authorized | | |
| LOCATION CATEGORY: | ☐ CUSTOMER INSTALLABLE<br>☐ ON-SITE<br>■ HP LOCATION | SERVICE INVENTORY: | ☐ RETURN<br>☐ SCRAP<br>☐ SEE TEXT | USED PARTS: ☐ RETURN<br>■ SCRAP<br>☐ SEE TEXT |
| AVAILABILITY: | PRODUCT'S SUPPORT LIFE | RESPONSIBLE UNTIL: 14 January 1996 | | |
| AUTHOR: KLB | ENTITY: 4600 | ADDITIONAL INFORMATION: On all CSO's enter REPAIR TYPE as "02G" and REPAIR CLASS as "SN". In the Comment field refer to the Service Note Number. | | |

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an accordion jam occurs replacing the output roller holders (quantity of 4) part number RF5-0425-000CN will generally resolve the problem. If the jam is not an accordion jam then replacing the output rollers will not fix it. If the printer is having excessive paper jams that are not accordion jams then do not replace the output roller holders. Proceed as directed in the LaserJet 4/4M Printer Service Manual pages 7-26 through 7-33 for troubleshooting 13 Paper Jam Messages.

When replacing the output roller holders refer to the attached figure or to the LaserJet 4/4M Printer Service Manual page 8-23 figure 8-13. Remove the Upper Delivery Guide p/n RF5-0532-000CN reference number (r/n) 17 and the Upper Delivery Roller p/n RF5-0534-000CN r/n 16 to gain access to the Output Roller Holders. When replacing the Output Roller Holders make sure that the Compression Springs p/n RS5-2185-000CN r/n 13 are switched from the old output roller holders to the new holders and seated properly on the spring pads in the Output Assembly.

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Printed in USA 3/96

Manual Part No.
C3916-90984

C3916-90984